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Number 2.

MAY, 1904.

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TEXTILE WORLD RECORD

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LORD & NAGLE COMPANY · Boston & Philadelphia

COPYRIGHT, 1904, LORD & NAGLE COMPANY.

The Report of the Annual Meeting of the New England Cotton Manufacturers' Association Contained in this Number.

The Textile-Finishing Machinery Co.

17 EXCHANGE PLACE, PROVIDENCE, R. I.

Mercerizing Machinery for Piece Goods and Yarn in the warp or chain

Singeing Machines,

Boiling Kiers,

Washers, Squeezers,

Chemic and Sour

Rusden Patent

Continuous Chainless

Steamer,

Aniline Agers,

Dyeing Machines,

Open Soapers,

Blanket Washers,

Color Kettles,

Horizontal or Vertical Drying Machines, with Copper or Tinned Iron Cylinders,

Automatic Tentering Machines,

Water and Starch Mangles,

Dampening Machines,

Dyeing Machines for Chain Warps.

BUILDERS OF ALL KINDS OF

MACHINERY

FOR

BLEACHING

DYEING

DRYING

AND

FINISHING

Calenders for Rolling, Glazing, Chasing and Embossing, also Calenders for Moire Finish.

Patent Combination Rolls made of Cotton and Husk especially adapted for Soft Finish, Unequalled for Elasticity and Durability.

Cotton, Paper, Husk, Chilled Iron, Brass and Rubber Rolls, Electro-deposited Copper Rolls for all Purposes.

Padding and Drying Machines for Shade Cloths.

Single and Double Cylinder Engines.

Hydraulic Presses and Pumps.

ALL KINDS OF OUTFITS FOR BLEACHING THREAD AND SOFT TWISTED YARN.
BLEACHING MACHINERY FOR YARNS IN THE WARP OR CHAIN.

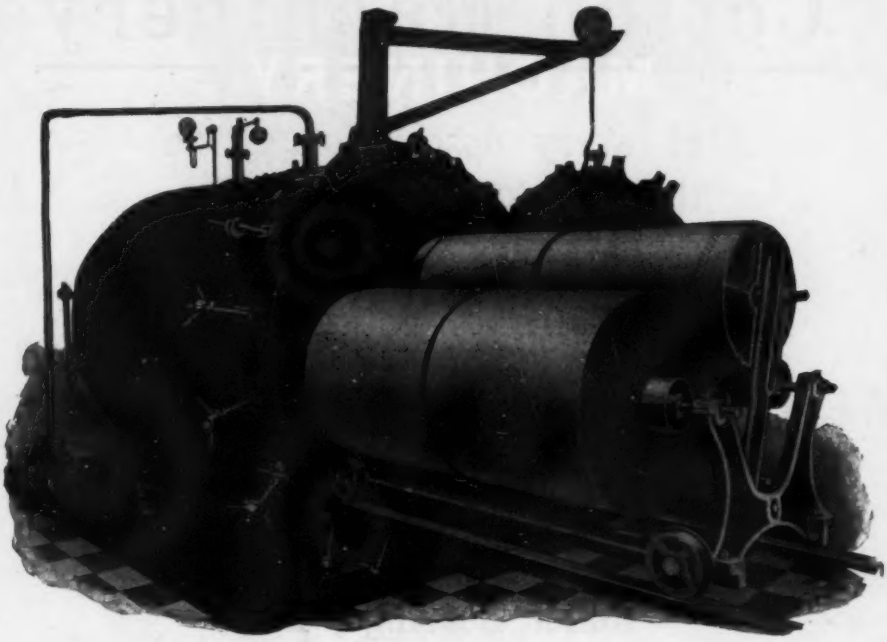
Estimates, drawings and full particulars of complete plants furnished on application

Open Bleaching System

OF

JACKSON & HUNT

Patented in the United States, Great Britain and the Continent
U. S. Patent, January 15th, 1901. No. 666,056



H. W. Butterworth & Sons Co.

Manufacturers of

Bleaching, Dyeing, Drying and Finishing Machinery

YORK AND CEDAR STREETS

PHILADELPHIA

Sole Makers for the United States

LOWELL

Cotton Machinery

of every description, from
the Card to the Baling Press.

Special Catalogues for each department.

Complete Textile Equipment and Plans
for Cotton Mills.

Worsted Machinery

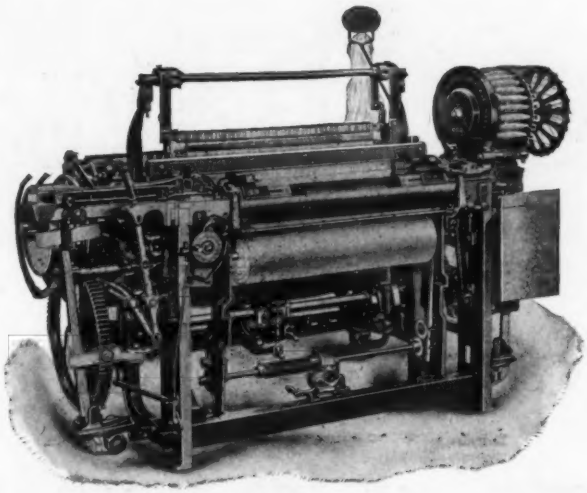
With Latest Improvements,
Roller Bearings, Etc.

Spinning Frames, Dandy Rovers and Reducers,
Weigh Boxes, Drawing Boxes, Gill Boxes, Etc.
Built in America. Equal to the World's Best.

Send for Catalogue.

LOWELL MACHINE SHOP

LOWELL, MASS.



THE J MODEL LOOM

DESIGNED exclusively for Print Cloths and similar light fabrics. Will weave without a thick or a thin place. Can bang off without shock. Has the large hopper, the Draper-Roper let-off, a new take-up and a new warp stop knock-off.

Large orders now being filled by the

DRAPER COMPANY,

Hopedale, Mass.

OUR LATEST!

AUTOMATIC FILLING STOP MOTION

This attachment will positively stop the loom just before filling runs out, leaving absolutely no mispicks, and it can be attached to any loom.

It can be seen in operation at our works, where we have also on exhibition our

Automatic Shuttle Changing Device.

THE ASALA COMPANY.

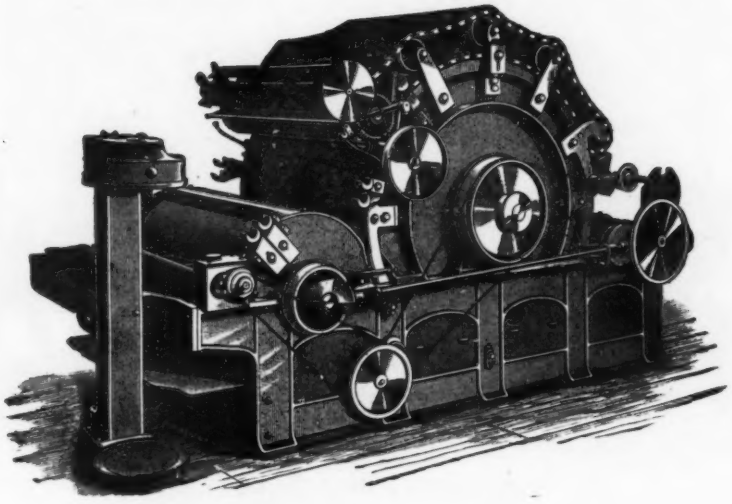
Works:
Slatington, Pa.

New York Office:
415 Broadway.

MASON MACHINE WORKS,

TAUNTON, MASS.

Cotton Machinery



Cards, Combers, Railway Heads, Drawing Frames, Spinning Frames, Mules and Looms,

INCLUDING

Plain and Fancy Silk Looms

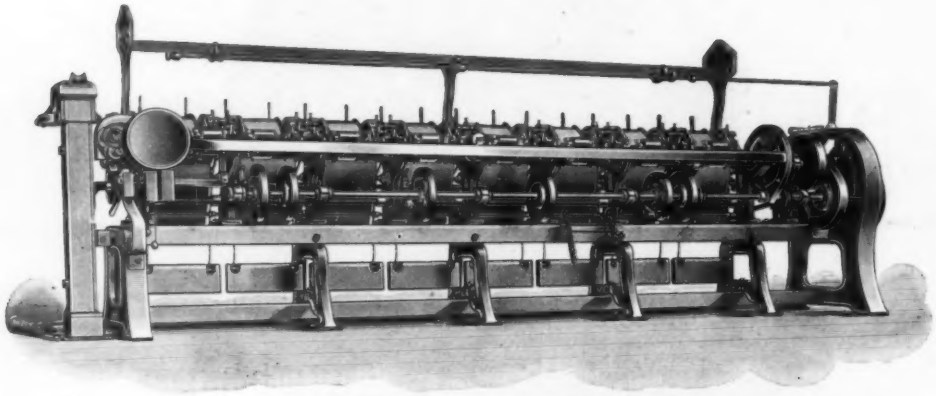
Southern Office, Charlotte, S. C.

THE

WHITIN MACHINE WORKS,

Cotton Machinery

WHITINSVILLE, MASS.



The Whitin 8 Head Comber.

Southern Agent, . . . S. W. CRAMER

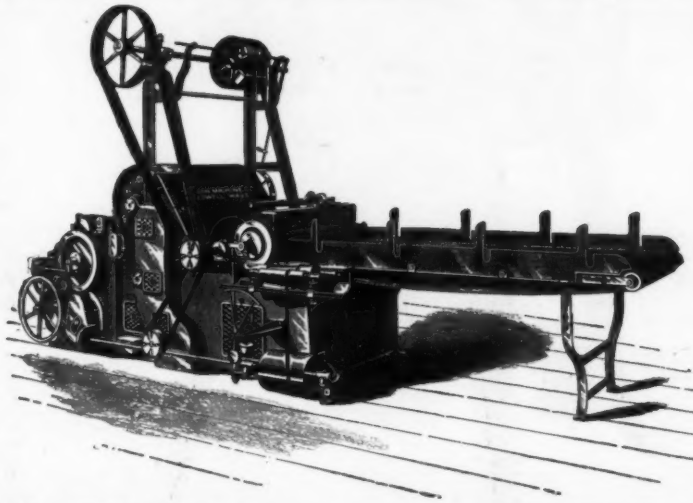
Trust Building, CHARLOTTE, N. C.
and Equitable Bldg, ATLANTA, GA.

Revolving Flat Carding Engines,
Sliver Lap Machines,
Ribbon Lap Machines,
Combers,
Railway Heads,
Drawing Frames,

Spinning Frames,
Spoolers,
Twisters,
Reels,
Looms,
Long Chain Quilling Machines.

The Best Pickers

In the Cotton Field nothing equals the DARKY COTTON PICKERS.



In the Cotton Mill nothing equals the KITSON COTTON PICKERS.

KITSON MACHINE CO., LOWELL, MASS.

LARGEST BUILDERS OF COTTON OPENERS AND LAPPERS IN THE WORLD.

STUART W. CRAMER, Southern Agt., Charlotte, N. C. and Equitable Bldg., Atlanta, Ga.

SCOTT & WILLIAMS

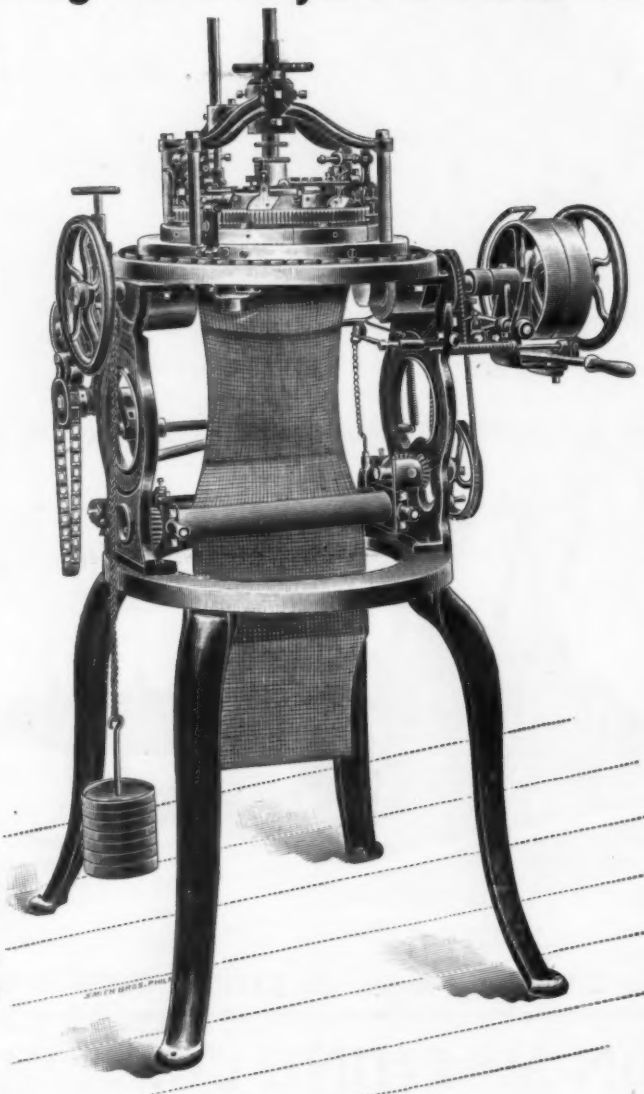
BUILDERS OF

Rib Knitting Machinery for Underwear and Hosiery

The illustration shows our

Improved High Speed Single Lever Automatic Ribbed Underwear Machine

for making ladies' and gents' ribbed underwear, union suits, etc., plain and shaped.



Plain, Single Lever or with Welt, Slack Course and Automatic Slackening Device for Welt.

Improved Measuring Device, by actual length knit.

Sizes. 8 to 24 inches, inclusive, varying by one inch.

Number of Feeds, four to 12, according to style and diameter of machine.

Solid Forged Steel Cylinders, specially hardened or with patent inserted walls for fine fabric.

Special Machinery for Sweaters etc.

We build Loopers, Ribbers and other Machinery for Knitting Mills

As well as

A Complete Line of Full Antomatic and 7-8 Automatic Seamless Hosiery Machinery.

Full Particulars, Samples and Special Catalogues on Application.

2079 E. Cumberland Street, Philadelphia, Pa., U. S. A.

BRANSON MACHINE CO.

BUILDERS OF

KNITTING MACHINERY

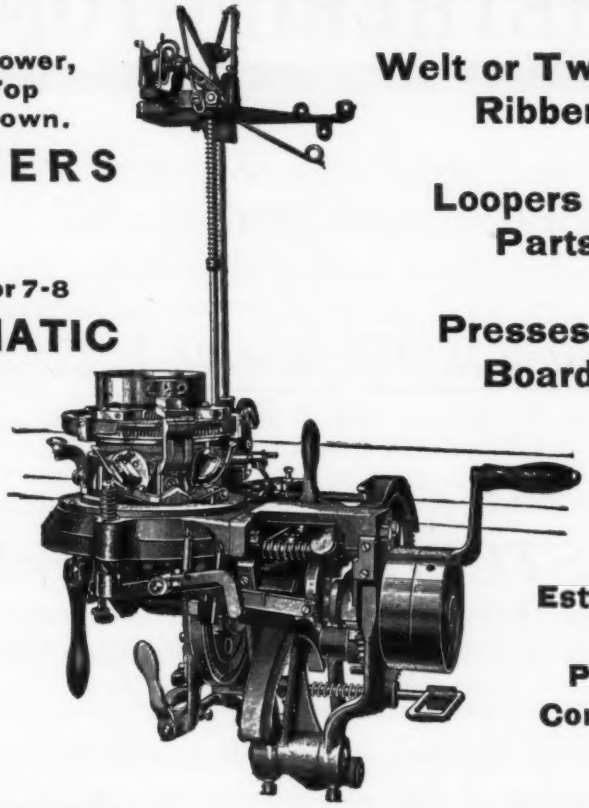
Hand or Power, Open Top or Hold Down.

KNITTERS

1-2, 3-4 or 7-8

AUTOMATIC KNIT-TERS

All Sizes and All Gauges.



Welt or Two-Feed Ribbers.

Loopers and Parts.

Presses and Boards.

Estimates for Plants Complete.

Winders and Bobbins. Hand Forged Steel Cylinders.

BRANSON MACHINE CO.

504 North American Street, : : Philadelphia, Pa.

Write for information and Catalogue.

Our Fire-Proof Metal Mule Carriage

reduces the danger from fire in the mule head to a minimum, and makes

HETHERINGTON'S

mule spinning more desirable than ever.

Our new Comber is selling beyond anticipations, 300 are now working and giving entire satisfaction.

None better in the world! The opinion of Thomas Ashton, England's great labor leader and member of the British Labor Commission, of the Mule Room at the Soule Mill, New Bedford, Mass., to the "Evening Standard" reporter on Nov. 25, 1902.

These Mules were Sold and Installed by

STEPHEN C. LOWE

186 Devonshire Street, .. Boston, Mass.

Agent for JOHN HETHERINGTON & SONS, Limited, Manchester, England.

Cards, Drawing, Slubbing, Intermediate and Roving Frames.

Combers, Lap and Ribbon Lap Machines.

Improved Heilman Combers. Over 4,000 running in U. S. A.

Catalogues, Information and Estimates on Request.

A FULL LINE OF PARTS FOR ALL OUR MACHINERY

Constantly in stock.

EVAN ARTHUR LEIGH

232 Summer Street (opposite the South Station), Boston, Mass.

SOLE AGENT IN THE UNITED STATES AND CANADA FOR

Platt Bros. & Co., Ltd.

BY FAR THE LARGEST MAKERS IN THE WORLD OF

Cotton, Woolen and Worsted Machinery

Platt's New Patent Cotton Comber will comb from 7-8 in. stock to Sea Islands.
Platt's Special Machinery for Making French Worsted Yarns.
Platt's Special Machinery for Making Cotton Waste into Yarns.
Platt's Woolen and Worsted Carding Engines, Special Designs.

MATHER & PLATT, LTD.

Dyeing and Finishing Machinery. Archbutt-Deeley System for purifying and softening water.

TEXTILE MACHINERY ASSOCIATION, LTD.

Flax, Hemp and Jute Machinery.

THE PATENT AUTOMATIC FEEDING MACH. CO., LTD.

Patent Feeding Machines for wool, cotton, flax, fur and fibrous material.

GEORGE HODGSON, LTD.

Looms for Worsteds, etc.

JOSEPH SYKES BROS., Card Clothing for Cotton.

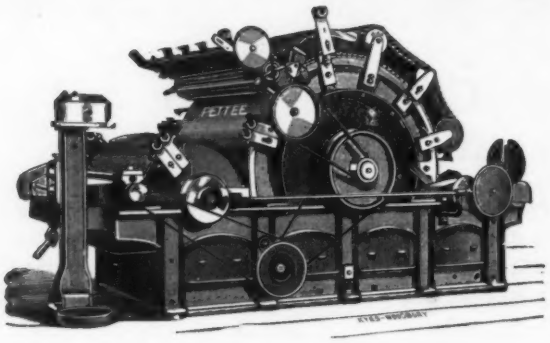
JAMES CRITCHLEY & SON'S, Card Clothing for Woolen and Worsted.

DRONSFIELD BROS'. Grinding Machinery and Emery Filleting.
The best French and English Combing and Rubbing Aprons.
Harding's Pins and Circles, Varey's Fallers, etc.

Saco and Pettee Machine Shops

NEWTON UPPER FALLS, MASS., U. S. A.

COTTON MACHINERY



PICKERS,
REVOLVING FLAT CARDS,
DRAWING FRAMES,
RAILWAY HEADS,

SLUBBING,
INTERMEDIATE AND ROVING FRAMES,
SPINNING FRAMES,

SPOOLERS AND REELS.

Shops: { **Biddeford, Me.**
Newton Upper Falls, Mass.

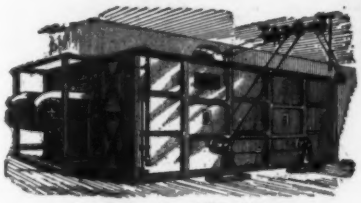
Southern Agent, A. H. WASHBURN, Charlotte, N. C.

"HURRICANE" DRYERS AND FANS

For WOOL, COTTON STOCK, YARN, STOCKINGS, UNDERWEAR, Etc.

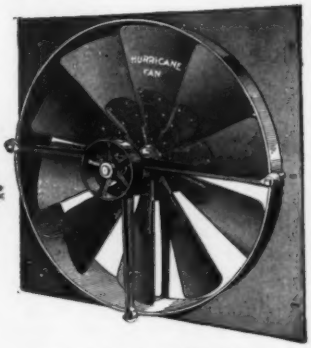
Write for Booklets.

Truck Yarn Dryer.



Cotton Stock and Wool Dryer.

MACHINERY FOR BLEACHING AND CARBONIZING.



"Hurricane" Fan, Style No. 2.

SPECIAL MACHINERY OF EVERY DESCRIPTION DESIGNED AND BUILT.

PHILADELPHIA DRYING MACHINERY CO.

6721 Germantown Ave., Philadelphia, Pa.

HOUGHTON'S ALL STEEL THREAD BOARD

with Hardened Thread Guides.

PRICE.

Steel Thread Boards, 7½ c. per Sp.
Brass " " 15 c. "
(f.o.b. Worcester.)

Add 3 c. each for Metal Rail.

PATENTED.

Nov. 30, 1897.	Nov. 9, 1901.
Mar. 8, 1898.	June 9, 1903.
July 1, 1901.	Mar. 1, 1904.

and other patents pending.

(Our Latest Model Hinge and Steel Rail.)

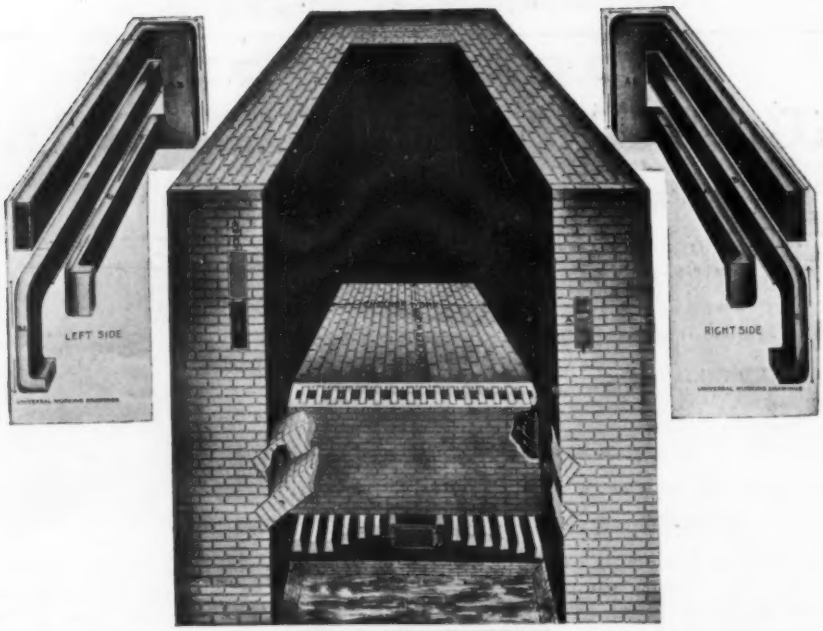
The only Thread Board that ***holds a guide solid*** all the time; ***never*** gets loose; is always in perfect adjustment, and thus must make a saving in travelers, broken ends, waste, thread guide, care and also prolong the wear of rings and increase the production per spindle. These claims are based on the truth of mechanical principles, and have been proven true by actual use in many mills whose superintendents will substantiate these claims. Write for list of mills using our Thread Boards.

L. T. HOUGHTON, Sole Manufacturer, WORCESTER, MASS.

The Smoke Nuisance and the Profligate Waste of Fuel is Settled for all time

By the invention and practical operation of the DR. J. B. HARRIS SYSTEM. Absolute combustion of soft coal in steam boiler furnaces. NO SMOKE. Cheap and efficient. Harris' Smoke Consuming Furnaces last as long as the boiler. 35 per cent. to 50 per cent. cheaper. By actual test evaporates 33 1-3 to 40 per cent. more water per pound of combustible. Burns any kind of fuel without smoke. Burns crude oil without smoke or odor. Pays for itself in six months. Patented March 22, 1904.

TYPICAL SETTING FOR RETURN FLUE TUBULAR BOILERS



TYPICAL SETTING FOR WATER TUBE BOILERS

Heine, Franklin, Geary, and with modifications in floor of Combustion Chamber suited to Babcock & Wilcox, Zell, Root, Stirling, etc.

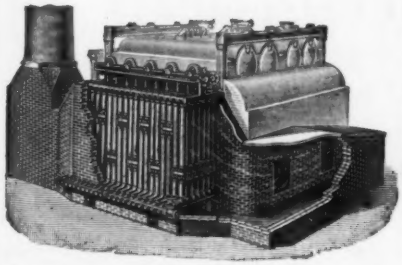
Write for catalogue. County and State rights for sale, with or without royalty.

J. B. HARRIS, M. D., Patentee and Sole Owner, **71 Arcade, Nashville, Tenn.**

THOUGHTFUL CONSIDERATION

on the part of the Engineer, makes great economies in the running of a Plant, particularly if assisted by a

Green's Economizer



which is the greatest assistant to true economy yet produced. The gain in steam, with the corresponding reduction of fuel, seems incredible, but with our Economizer you can easily save from 10 to 20% in Fuel, and yet, through the use of waste gasses entirely, keep the feed-water heated above the boiling point. What this means to the **Textile Mill, Bleacheries** and **Dyehouses,** is best ascertained through the testimonials of those having one in their boiler room. Our booklet, sent free, shows not only how it is done, but gives you a list of users, and their testimonies as to the value to them. Our great advantage—applied without stoppage to works Write us for plans and specifications.

THE GREEN FUEL ECONOMIZER CO.,

Sole Manufacturers in the U. S. A. **Matteawan, N, Y.**

THE OLD WAY.

Oiling stock with a tin can with holes punched in the bottom, or a watering pot. Wasteful of oil and labor and seldom done twice alike, but is still used in some mills.

What Changes!

THE MODERN WAY.

Oiling and dampening stock with the Spencer Automatic Oiler applied to feed table of wool picker, lumper or lapper. Batches treated as desired. Perfect regulation.

Not much need to dwell upon the advantages of the automatic system, by which uniform results are obtained with saving of oil and labor, as compared with the sloppy, guess work, waterpot system.

It's the story of the Bramwell and Apperly feeders over again. How many mills are feeding by hand to-day? There will be very few oiling by hand in a few years. Hundreds of the best mills are using the Spencer Oiler to-day. Are you? If not, send for particulars.

GEORGE S. HARWOOD & SON, 53 State St., Boston.

THE

A. T. ATHERTON MACHINE CO.

PAWTUCKET, R. I.

The Leading Manufacturers of

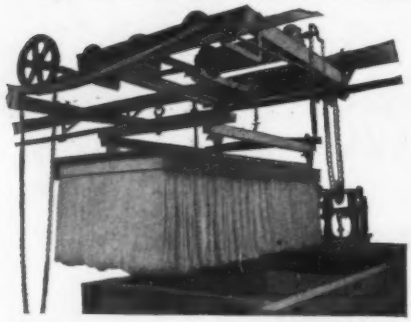
PREPARATORY COTTON MACHINERY

The Hussong Dyeing Machine

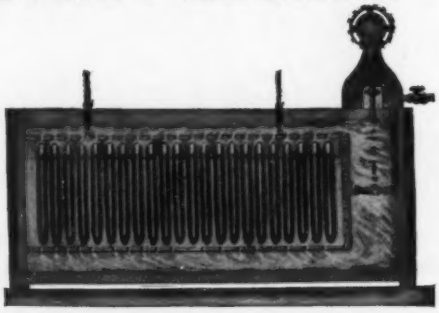
Patented Nov. 6, 1900. April 9, 1901.

For Dyeing both Alizarine and Acid Colors on Yarn.

A PERFECT SKEIN DYEING MACHINE.



This illustration shows our Compressed Air Hoisting Carriage, with 300 pound Yarn Machine suspended.



Longitudinal Sectional View, showing the circulation of dye-liquor through the yarn when in operation.

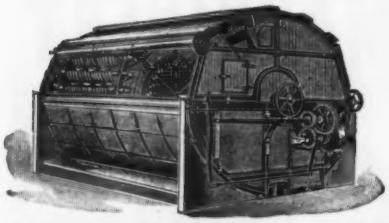
Points of Superiority Which We Claim for the Hussong Machine.

Durability, Even Dyeing, Saving of Steam, Saving of Dyestuff,
Saving of 75% in Labor, Makes No Waste Whatever, No Friction on the Material,
Requires but Little Power to Operate,
Leaves the Yarn and Slubbing in its Natural Condition.

Built by the AMERICAN DYEING MACHINE COMPANY, Office 609 Pearl St., Camden, N. J.

Reference Given on Application.

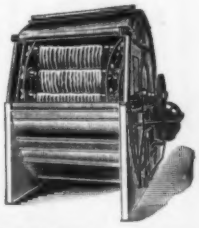
SKEIN AND SLUBBING MACHINES



SAVES

75% in Labor.
30% in Winding.
Steam and Dye Stuffs.
No Friction.
No Tangling.

CAPACITY
50 to 700 lbs per batch.



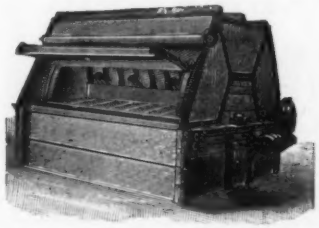
THE KLAUDER-WELDON DYEING MACHINE CO.

AMSTERDAM, N. Y.

Builders of Machines

For Skein—Worsted, Slubbing, Cotton and Silk.
" " and Warp Mercerizing.
" Raw Stock Cotton, Wool, Waste and Rags.
" Garments Underwear, Hosiery and Caps
" Sulphur Colors—Raw Stock, Skein and Hosiery.

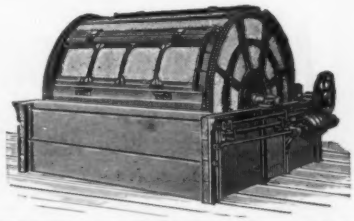
RAW WOOL AND COTTON MACHINES.



CAPACITY
200 to 1000 lbs per batch.

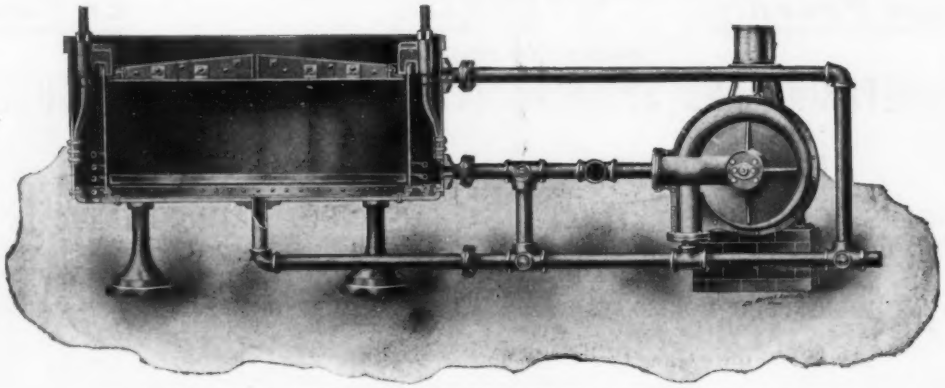
SAVES

50% in Labor besides Steam and Dye Stuffs. Practically indestructible. Leaves stock in perfect condition.



VACUUM DYEING MACHINE CO., CHATTANOOGA, TENN.

RAW STOCK, YARN AND HOSIERY DYEING MACHINES



This is our Yarn Dyeing Machine like that in use by Charles Chipman's Sons, referred to in letter below.

CHAS. CHIPMAN'S SONS, EASTON, PA. Hosiery Manufacturers and Spinners of Hosiery Yarns, Nov. 14, 1903.

VACUUM DYEING MACHINE CO., Chattanooga, Tenn.

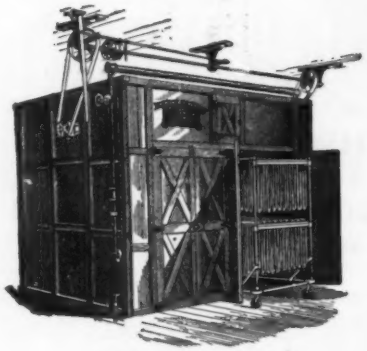
GENTLEMEN: In reply to your letter of the 11th inst., would say, we have now been running one of your sulphur black machines for about one year. Since getting this machine started and working, we have not had to put any expense whatever on the same for repairs and it appears as good today as when it was first installed. We are getting very satisfactory work out of the same and can consider it all right in every respect.

Yours truly, CHARLES CHIPMAN'S SONS.

Warning.—All persons are warned that this machine is fully covered by United States Letter Patents, and any one infringing the same will be proceeded against to the full extent of the law.

"20th CENTURY" MACHINERY

DRYERS
for
WOOL,
COTTON STOCK,
YARN, STOCKINGS,
UNDERWEAR.
VENTILATING FANS.
MACHINERY
for
CARBONIZING
and
YARN SCOURING.



TRUCK YARN DRYER.

CLOTH WASHERS
and
CLOTH DYEING MACHINES, BLEACHING MACHINERY FOR KNIT GOODS, ETC.
CONTINUOUS SYSTEM
FOR BLEACHING COTTON STOCK.
TOM-TOMS,
CHROMING, WASHING
and
OXIDIZING MACHINES.

AMERICAN DRYING MACHINERY COMPANY,

19th AND WESTMORLAND STS., PHILADELPHIA, PA.

Fairbairn Lawson Combe Barbour, Ltd.

LAWSON BRANCH,

Hope Foundry. **LEEDS.** **England.**

MAKERS OF MACHINERY FOR

PREPARING AND SPINNING FLAX, HEMP, TOW AND JUTE

AND OF

Special Machinery for the Manufacture of Twines,

ALSO OF

GOOD'S COMBINED HACKLING AND SPREADING MACHINE,

LONG REACH SCREW-GILL DRAWING FRAMES,

CHAIN-GILL DRAWING FRAMES with Apron Head,

PATENT HIGH-SPEED HORIZONTAL AND AUTOMATIC SPINNING FRAMES FOR MANILLA,

AND OTHER

Special Machinery for the manufacture of Rope Yarns and Binder Twine.

IMPROVED LAYING MACHINES. HASKELL-DAWES TUBING TWISTERS

BROWNELL'S PATENT TWISTING AND LAYING MACHINES FOR TWINE.

Complete Plans and Estimates for Flax, Tow, Hemp and Jute Mills, Trawl Twine Factories and Steam Ropeworks.

"A Stitch in Time Saves Nine."

A true saying. Do you realize that a

Burt Exhaust Head

placed on your exhaust pipe today will save you many times its cost,

which would later be spent for repairing damaged roofs and walls caused by steam from exhaust pipes if the **Burt Exhaust** was not used. Follow the example of the Ludington Co., Marinette, Wis.: "Please send us another Burt Exhaust Head; we are charmed with the efficiency of the one we now have and must have another."

An early order means money saved for you. State size of pipe when ordering. Return if dissatisfied.

The BURT MFG. CO.

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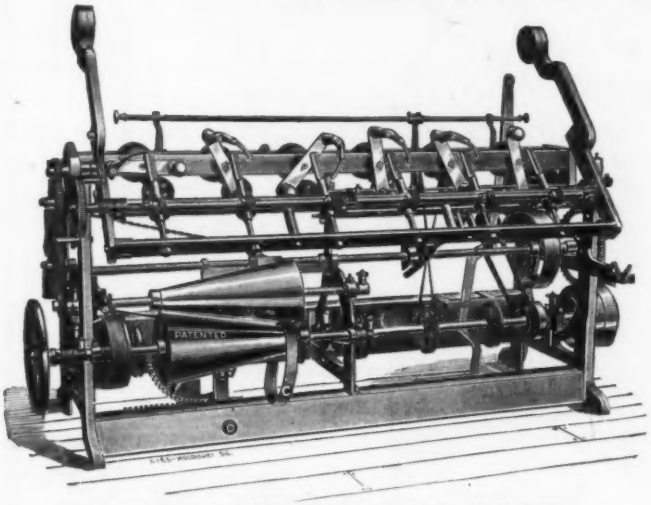
Successors to SILVER & CAY CO.



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QUILLERS,
REELS,
BALING PRESSES
AND
SPECIAL COTTON MACHINERY.

SPECIAL—AUTOMATIC BALL WINDER.
Adapted to All Kinds of Twines, Silks and Floss.

NORTH CHELMSFORD, MASS.

BIRCH TREE.

ALBERT BIRCH,
Manager.

TEXTILE FINISHING MACHINERY

WORKS ON LINE OF FITCHBURG RAILROAD
No connection with any other concern. Our only place of business for 15 years is at
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to which place please address your enquiries.

BIRCH BROTHERS COMPANY

SOMERVILLE MACHINE WORKS,

WOOLEN and WORSTED FINISHING MACHINERY

And also for

BLEACHING, DYEING, DRYING and FINISHING COTTON GOODS.

Send for Circulars and Prices.

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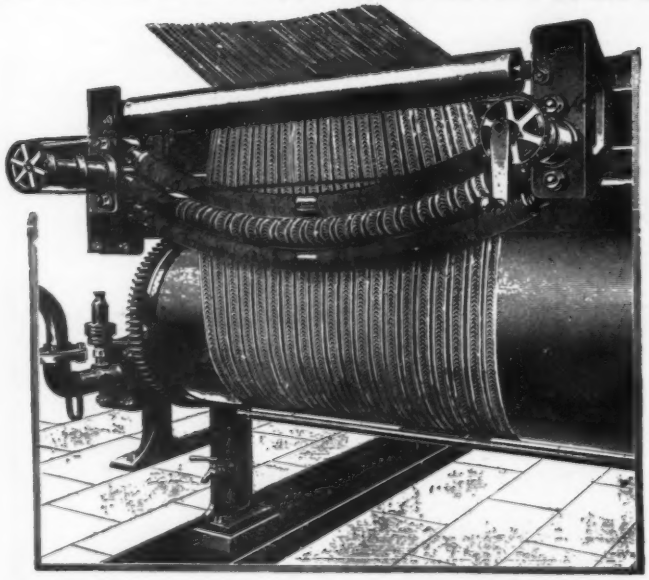
A PERFECT CLOTH EXPANDER



The recent invention of Wm. Mycock, an English cotton manufacturer. Hundreds sold in Great Britian and on the Continent. Large bleacheries in this country where it has been placed on trial are delighted with it. Gets the full width of goods, with perfectly even tension both ways. Can be attached to calenders or cans. Put it on trial.

Patented in United States, Canada, Great Britain and Continental countries. Infringements will be prosecuted.

THOMAS LEYLAND & CO., 53 INDIA ST., BOSTON.
Sole Agents for the United States and Canada.

Kenyon's Improved Cloth Washer

FOR FOUR, SIX OR EIGHT STRINGS OF GOODS

BEST QUALITY SOLID ROLLS.

Improved trough and valves, preventing wash of liquor and insuring quick and thorough scouring and rinsing.

D. R. Kenyon & Son, RARITAN, N. J.

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WATER WHEELS,
Horizontal and Vertical.
Iron Flumes and Penstocks.
Rotary Fire Pumps.
Centrifugal Pumps.
Head Gate Apparatus.
Water Wheel Regulators.
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Rotary Cloth Washers.
Rotary Knit Goods Washers.
Combined R'y Fulling Mill and Washer for Knit Goods.
Endless Felt R'y Washers and Rotary Felling Mills.
Hammer Falling Stocks.
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Crank Fulling Mills.
Crank Knit Goods Washers.
Wringing and Rinsing Mchs.
Reel Dyeing Machines.
Carbonizing Machines.
Bleaching Machines for Chloride of Lime and Peroxide of Sodium,
Dye Tubs and Rinsers.
Wool Washers.
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Cloth Winders.

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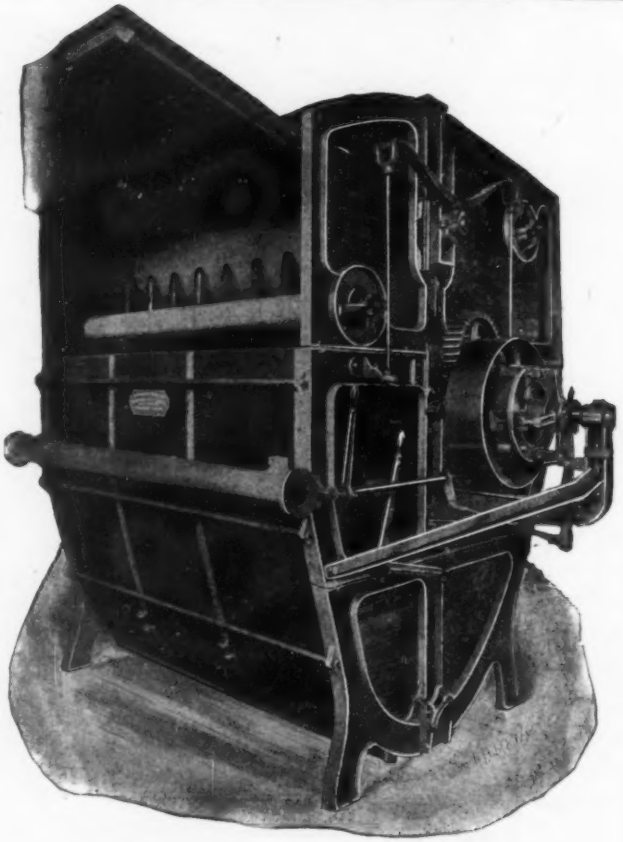

Type C. For All Fabrics.

Improved Attachments for Fulling and Washing Knit Goods in the roll. Is fully described in Circular No. 10.

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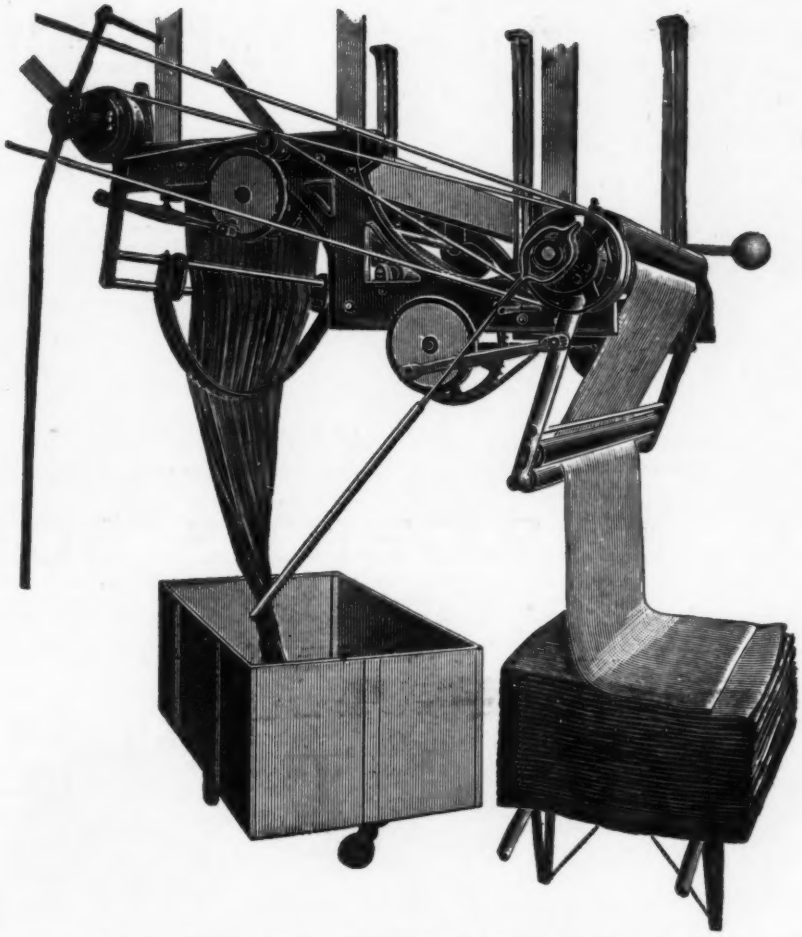
The Hunter CLOTH OPENER AND FOLDER



ONE MAN CAN OPEN AND FOLD MORE GOODS IN A DAY WITH THIS MACHINE THAN FOUR MEN CAN DO BY HAND.

No stretching or beating of goods under tension. All the parts coming in contact with cloth are brass or wood.

Opens any width of cloth from 63 inches down to 30 inches. Can be built wider for blankets.

James Hunter Machine Co., North Adams, Mass.

YOU WANT THE BEST. WE BUILD THEM.

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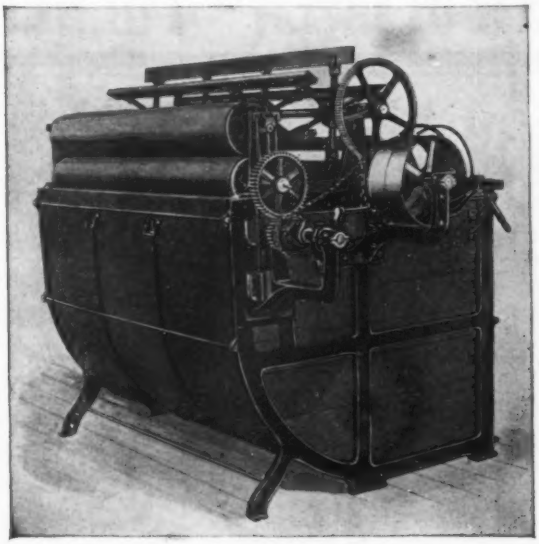

1903 PIECE DYEING MACHINE.

FULLING MILLS

Piece Dyeing Machines,
Dye Tubs, Vats,
Tanks, etc.

HOPKINS MACHINE WORKS

PROVIDENCE AND BRIDGETON, R.I.

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49 Westminster Street.

Our machines are up to date.
Patented features found in no others.
Most effective and economical machines built.

Send for Catalog, Prices, and also ask about our fulling mill for extra heavy goods and blankets.

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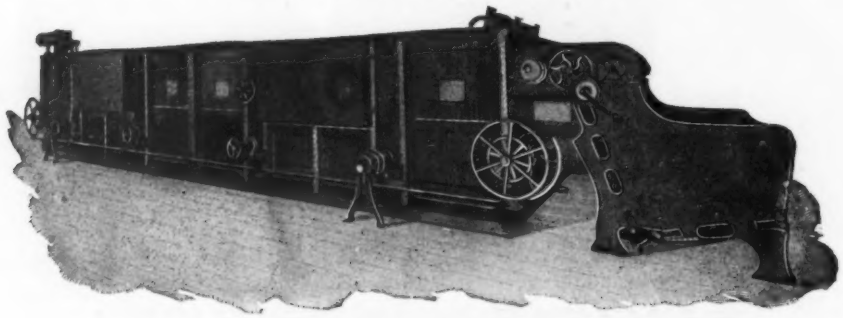

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Stock Dryers, Wool Washers,
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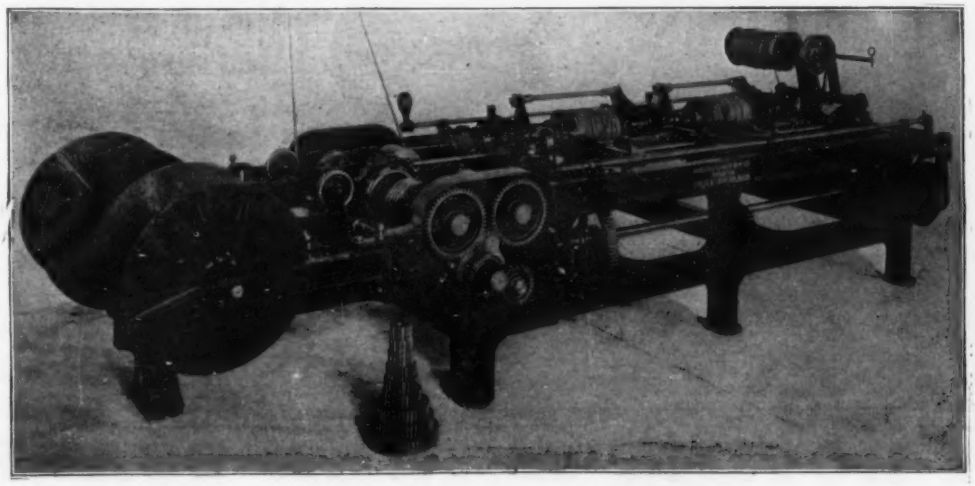
THE HASKELL-DAWES MACHINE CO.

Manufacturers of the best types of

Forming, Twisting and Laying Machinery

Which are adapted for making all kinds of

COTTON CABLE-LAID TWINE, CORD and ROPE



The Haskell-Dawes Machines are built upon a NEW PRINCIPLE, whereby the MOST POSITIVE RESULTS ARE SECURED. They occupy LESS SPACE than the ordinary type of machines, require LESS RELATIVE POWER, and will turn out a MUCH LARGER PRODUCT of Twine and Rope. The SPECIAL ATTENTION of Cotton Manufacturers is called to our new FORMING AND ROPE-LAYING MACHINES. Descriptive Catalogue Sent on Application.

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AND ALL BRAIDED FABRICS.

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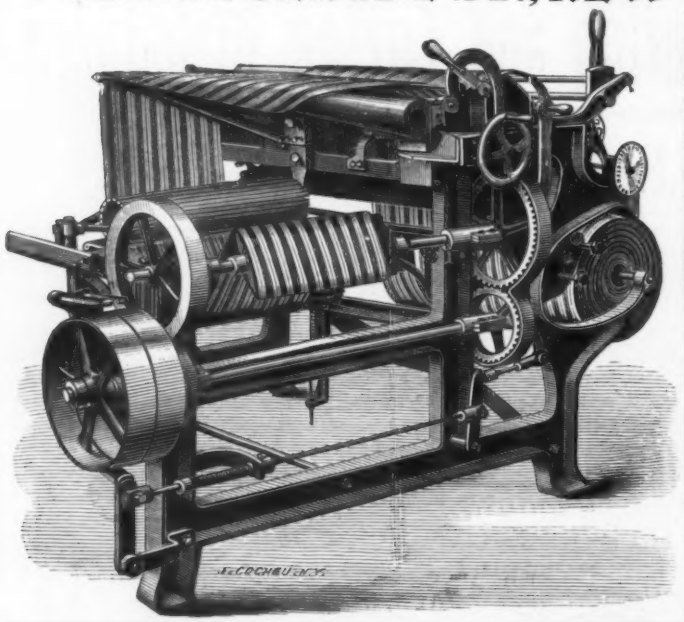

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On Cottons, Woolens and Carpets.

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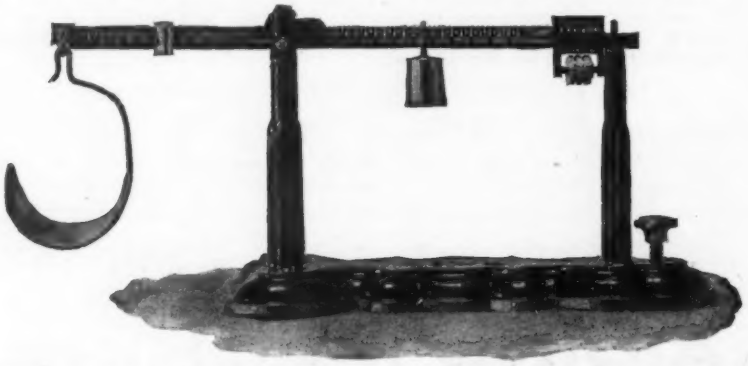
and imprint the measurement upon fabrics, fold lengthwise and roll into merchantable packages all in one operation.

Prevents claims for short measure.
Marks piece numbers on each package.

A Fully Equipped Machine Shop for General Work.

A ROVING or YARN SCALE

That will weigh by HALF GRAINS up to 1,000 GRAINS (over 2 1-4 oz.)



WITH THE WEIGHTS ALL ON THE BEAM. NO LOST WEIGHTS WITH THIS SCALE.

One of the most sensitive scales made. Positive and accurate. Send for prices.

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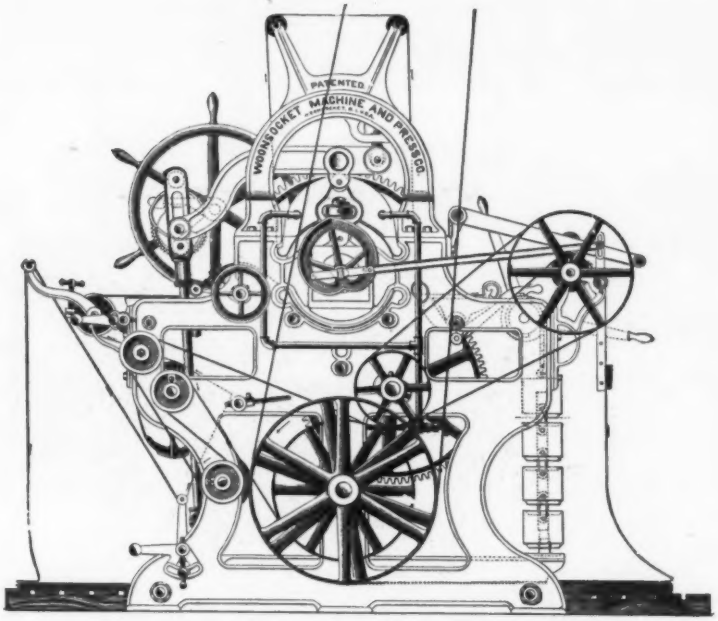
☞We make scales of every description.

Best Patent Steam Rotary Cloth Press

Four Separate Pressings In One Machine!

The Only Press that has Self-Yielding Beds with Four Points of Contact

PERFECT TEMPERATURE, POWERFUL, SIMPLE



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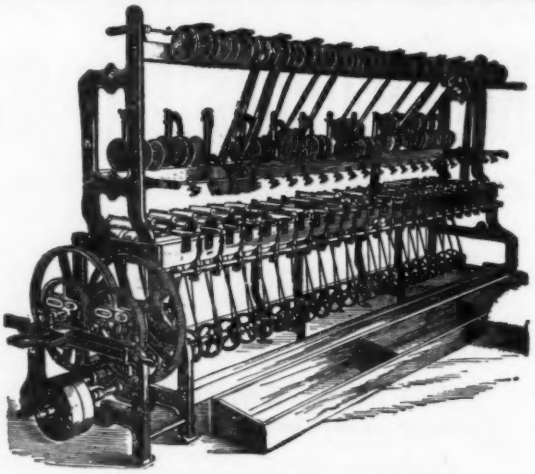
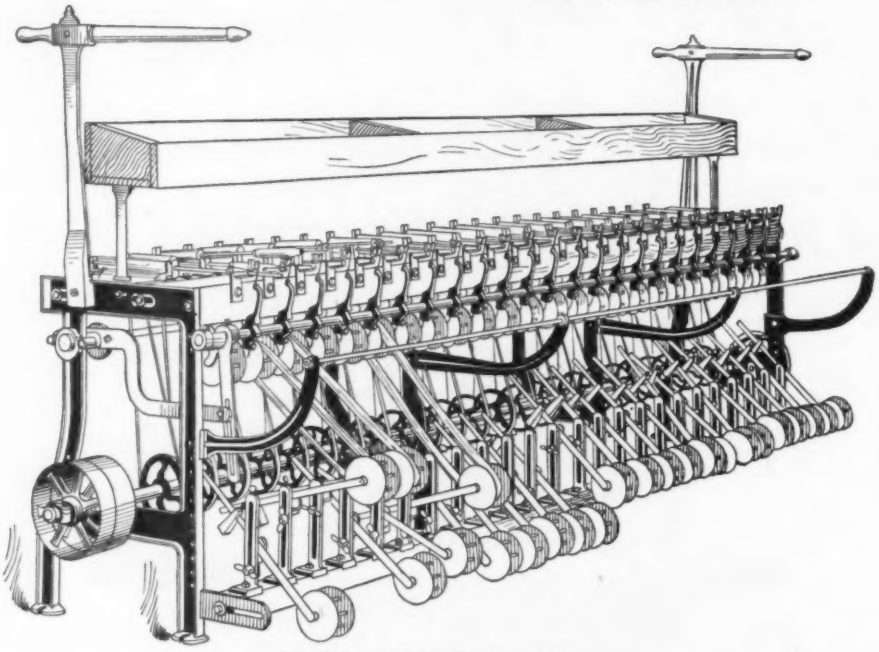


Patent Shuttle Bobbin Winder for Skeins, with Patent Variable Motion.



Patent Butt and Cop Winding Machine.

JACOB K. ALTEMUS,

2818 North 4th Street, PHILADELPHIA, PA.

FULL PARTICULARS ON APPLICATION.

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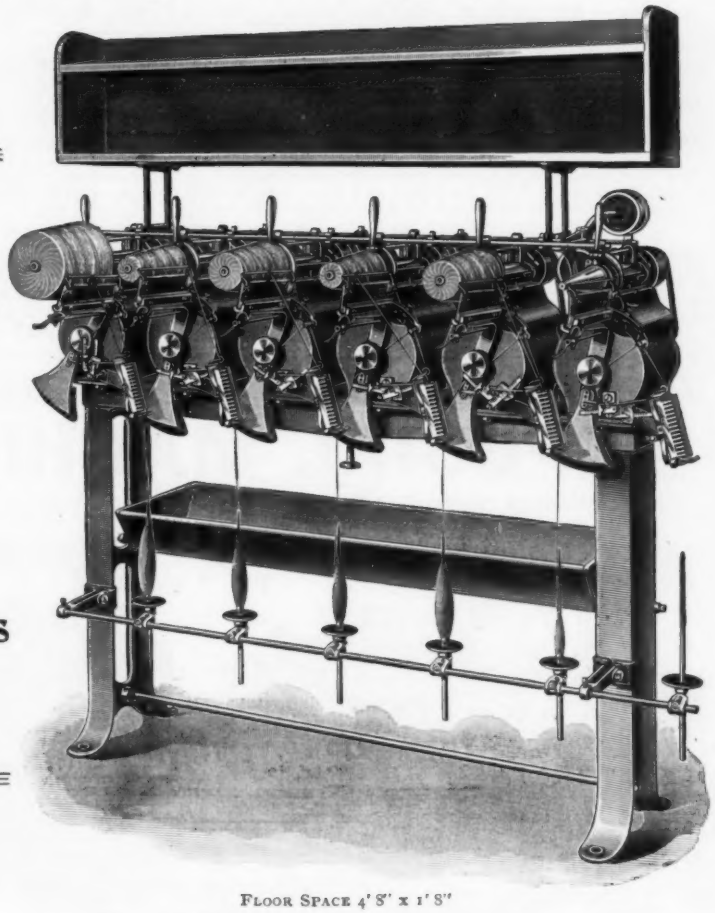
Twentieth Century Winding Machine

Our New
No. 50 Machines
Wind Cones
for
Knitting and
Double Fine Yarns
for
Twisting.



Floor Space 4' 8" x 1' 8"

They Combine { **Durability, Compactness, Simplicity, Economy.**

Fitted with such delicate tension devices that the finest yarns are wound without strain at high speed.

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SPECIAL MACHINERY,

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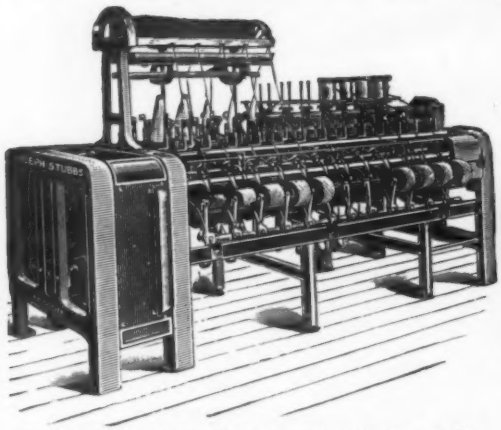
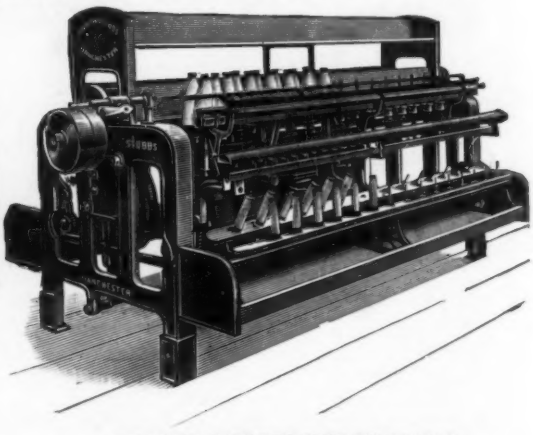


PATENT QUICK TRAVERSE COTTON GASSING FRAME.



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With Patent Tapering Motion, for Single Flanged Bobbins.

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Pulley and Gear Forcer.

We build a simple, powerful and very effective machine to remove gears and pulleys from shafting. Many mills use them. **Only costs $8.00.** Saves its cost in time and breakage.

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Received the HIGHEST AWARD on recomendation of the FRANKLIN INSTITUTE for

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The Only Perfect System of Air Moistening

And Has Been Adopted by the Representative Manufacturers of this Country.

The only System adopted in the Textile Schools. Write for Booklet "T" on Humidification. Legal Proceedings will at once be taken against infringers and users of infringements.

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FOR COTTON, AND GINGHAM MILLS, BLEACHERIES, PRINT WORKS, ETC.

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SILK MILL SUPPLIES

OF EVERY KIND AND DESCRIPTION

Also Power Transmission Supplies for General Mill Use.

I. A. HALL & CO.
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Allentown Reed, Harness and Mill Supply Co.
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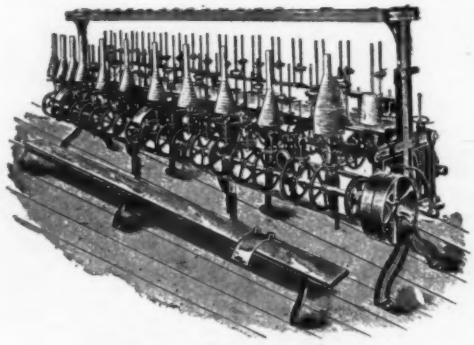

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OF ALL DESCRIPTIONS.

Special Machinery Built to Order.

Write for Particulars.

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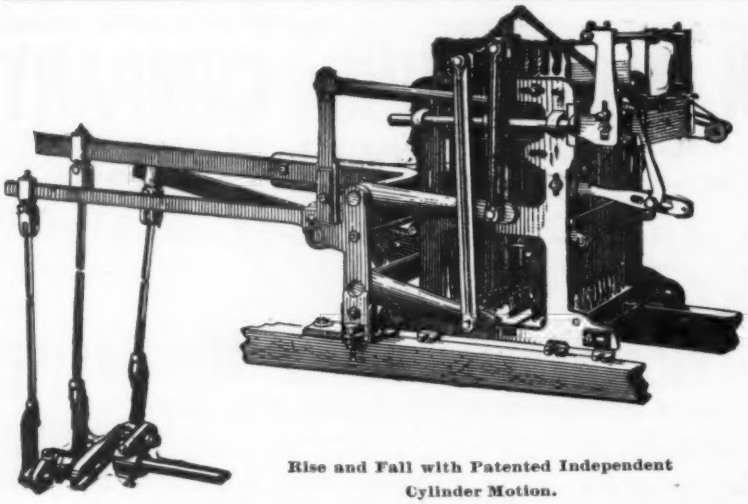
EXPERIMENTAL WORK on all kinds of Machinery OUR SPECIALTY

Estimates furnished on application



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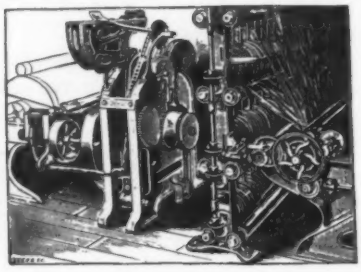

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With all the latest improvements for Wool Cards. The latest and best and only Feed that will make yarn positively even.

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CHOQUETTE WASTE SAVER. Saves card fly.

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For Cotton, Woolen, Worsted, Plush Goods, Etc. Shearing Machines a Specialty.

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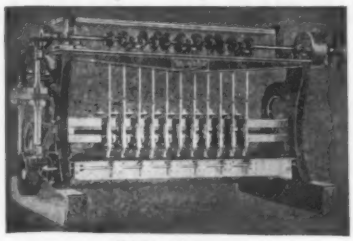

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L. F. FALES

MANUFACTURER AND BUILDER OF

SEWING Manhattan MACHINES

FOR ALL PURPOSES WHERE A NUMBER OF ROWS OF SEAMS ARE REQUIRED

BUILT WITH ANY REQUIRED NUMBER OF NEEDLES.

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Metallic Rolls

Especially adapted for Cotton Mills. 25 to 33 per cent more Production Guaranteed. Weight Reduced 33 to 50 per cent. No Leather Covering Bill.

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Mill Sewing Machines

Sew any fabric, wet or dry, thin or thick, fine stitch or coarse stitch.

Send for new circular telling how to get perfect work in this department.

BLEACHING, DYEING and FINISHING MACHINERY.

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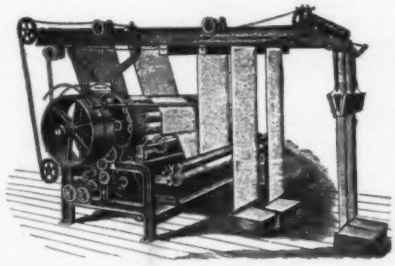
ECLIPSE NAPPING MACHINE.

Fabric in Direct Contact with the Napping Rollers all around the Drum.

Greater Production. Better Finish. Easier Threaded. No Shifting of Filling. Better results than can be obtained with teasels.



Long or short nap as desired on cotton or woolen goods, from the lightest to the heaviest.

No heavier napping on the sides than in the centre.

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Sole Manufacturers in the United States. FRANKFORD, PHILA., PA.

CIRCLES, HACKELS, GILLS, FALLERS and PORCUPINES.
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Makers of Rag, Wool, Hair and Finishing Pickers, Automatic Square and Cone Willows, "Schofield" Intermediate Feed for Cards, Rag and Extract Dusters, Waste Pullers, Worsted and Shoddy Reels, All Kinds of Spike and Slat Aprons.

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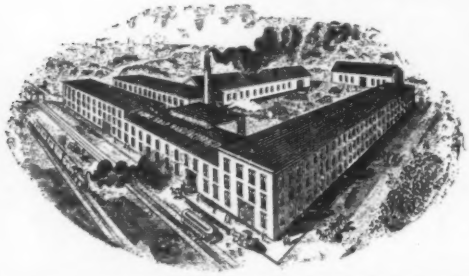

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Fulling, Scouring, Potash and Silk Soaps.

Pure Potash, Caustic Soda, Pure Alkali, Soda Crystals, Sal Soda, etc.

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PATENT GRIDS
FOR
COTTON OPENERS AND LAPPERS

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NEW ENGLAND DEPARTMENT
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W. H. ALLEN, Ass't Manager.

STEAM USERS of this country have upwards of 90,000 Steam Boilers under the inspection and insurance supervision of this company.

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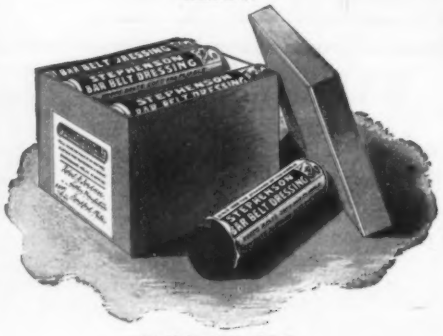

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STEPHENSON
BAR BELT DRESSING

INCREASED PRODUCTION.
DECREASED COST.
These Results We Guarantee.

Couldn't you induce your men to try it?

A trial seldom fails to bring a Second Order.

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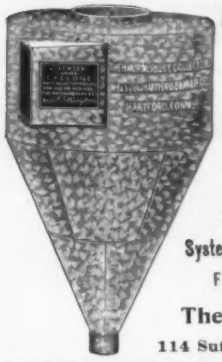

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With the Dust from Your Exhaust Fan? If so, the

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will obviate the nuisance.

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Blowers, Exhaust Fans, Dust Collecting Systems, Heating, Drying & Ventilating Systems.

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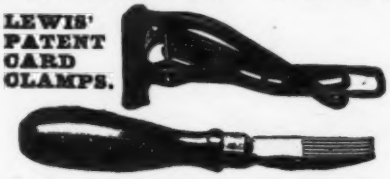
LEWIS' PATENT CARD CLAMPS.



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For Setting Up Bent Teeth of Card Clothing with a variety of all other tools used by carders and Manufacturers. Send for circular.

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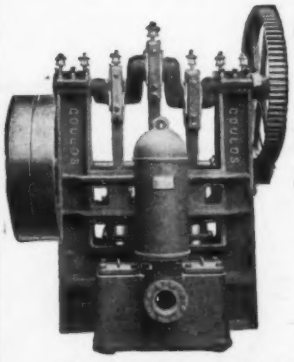
FOR EVERY SERVICE



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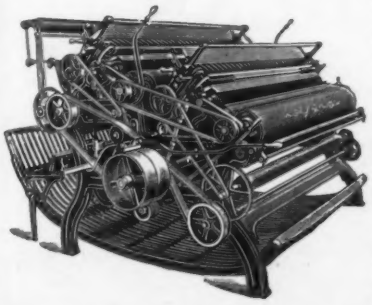

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Parks & Woolson Machine Co. Springfield, Vermont.

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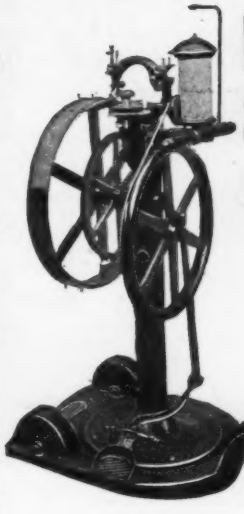

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No. 9—Portable Foot-Power Rotary Sewing Machine.

It is especially adapted for use in Cotton and Woollen Mills, Bleacheries, Print Works at the Printing Machines, in Dye Works, Cloth Rooms, at the Fulling Mill, Shears, Calendars, Gigs, Drying Machines, etc., or any of the different finishing processes in textile mills.

Manufactured by the

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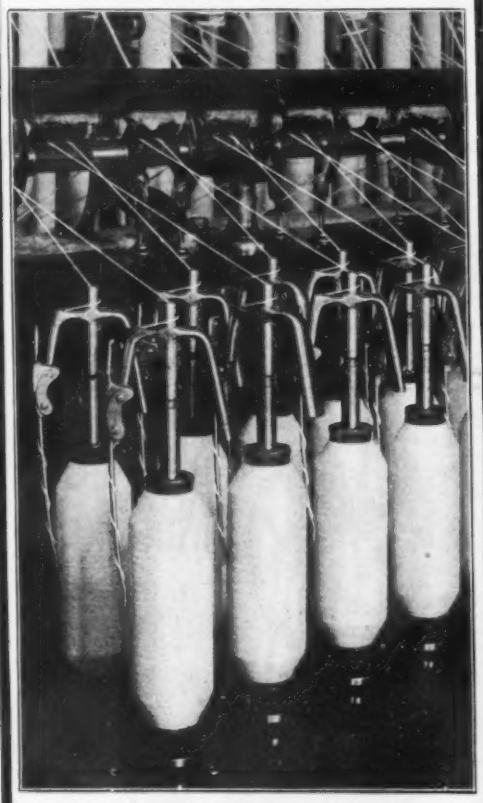
Presents new principles and methods in Flyer construction that have proved their value and made its use of marked advantage.



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at any speed saves cost of repairs, new pressers and other annoyances. Price list and further information may be promptly obtained by addressing the

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THE ORIGINAL—THE MOST HIGHLY IMPROVED

and consequently

THE SIMPLEST AND LOWEST PRICED.

These Saddles are literally *"Mechanical Peacemakers;"* they settle the vexed question of lubrication, promote cleanliness, are noiseless, durable and add materially to the life of the tapes. Write for Testimonial Leaflet.

OVER 80% OF THE AMERICAN WORSTED MILLS USE THEM

Manufactured under United States and Foreign Patents.

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MANUFACTURERS OF

Fluted Rolls, Pressers for Flyers

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Manufacturer of all kinds of SPINDLES, FLYERS, RINGS, TUBES, CAPS, etc., for Cotton, Silk, Flax, Woolen and Worsted Machinery.

Roving Spindles and Flyers a Specialty. Light Forgings.

REPAIRING OF ALL KINDS.

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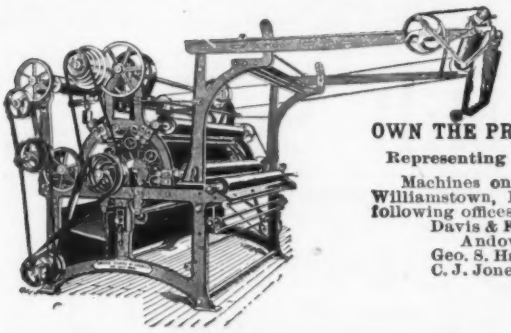

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OWN THE PRINCIPAL PATENTS ON NAPPING MACHINES.

Representing the latest French, English and American Patents.

Machines on Exhibition and Samples Napped at North Andover and Williamstown, Mass., or Philadelphia, Pa., on application to any of the following offices:

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Established 1870

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Cloth Tentering and Drying Machinery

for WOOLENS, WORSTEDS, FELTS, etc.

Built Upright or Horizontal with Low Down Feed

Ventilating Fans a Specialty

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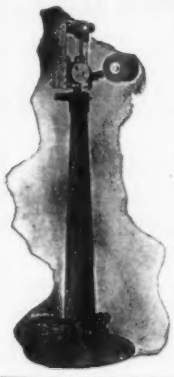

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For Cloth Samples and Garments.

Easily and quickly applied to fabrics of any weight.
Securely attached and yet easily detached if necessary to remove.
The machine does the whole thing.
It is cheap, serviceable and durable.

We also make a machine which

Prints the Tickets as they are attached if desired

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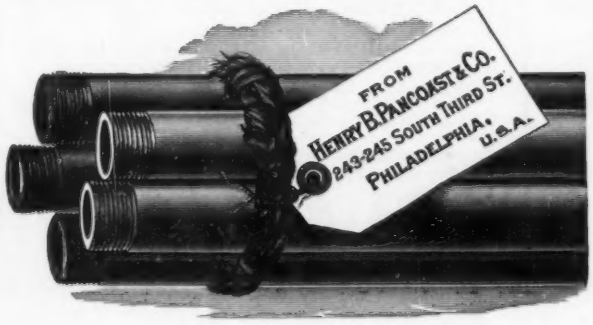

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Thread and Silk **SPOOLS** of any description.

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Seamless Woven and Rubber-lined EUREKA COTTON HOSE, "TROJAN" brand, has no equal. Send for Circular and Testimonials.

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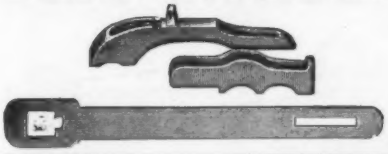

The weight can be taken off and put on to the middle rolls, without stopping your frames, when long-staple cotton is used.

THE STIRRUP IS ALWAYS IN PLACE.
NO BENT STIRRUP RESTING ON ROLLS.

Manufacturers of all kinds of **Saddles. Stirrups and Levers.** Send for Samples and Prices.

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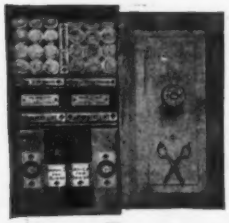
HENRY ASHWORTH, Agt. *FALL RIVER, MASS.*

Somebody Gets Hurt



Cut of No. 1

Nobody knows what to do or has anything to do with, until the doctor comes and every minute's delay counts against the injured.

THE STANDARD ACCIDENT CABINETS

Are designed for just such emergencies.

CONTENTS.

6 rolls linten bandages	2 in.	2 packages absorbent lint.	
6 " " "	2 1-2 "	2 " " cotton, 1-4 lb.	
3 " cotton "	1 1-2 "	1 12 oz. bottle carron oil.	
3 " " "	2 "	1 12 " " arnica.	
3 " " "	2 1-2 "	1 roll adhesive plaster.	
3 " " "	3 "	1 package iodoform gauze.	
2 packages first aid for wounds.		1 pair scissors.	
2 " linten gauze.			

These Cabinets contain only the highest grades of medicines and bandages which are thoroughly sterilized and antiseptic. Send for Circular. Price No. 2, $10.00; No. 1, $7.00.

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MAILS.

Liberal Discount to Dealers.

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REEDS, HARNESSES, LINGOES, SHUTTLES AND QUILLS.

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Manfrs. of *BRAIDING MACHINES*

for making Dress Trimming Braids, Cotton Tapes, Underwear Braids, Shoe Laces, Spindle Banding, etc. Winders, Doublers. Measuring Machines, Reelers, Singeing and Finishing Machinery. Special machinery.

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In the Manufacturing of **SPINDLES,**

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SAVE Their Cost In Freight.

THE CHAFFEE PATENT CLOTH BOARD,

Made of paper and wood,
Needs no covers,
Will not split or warp;
Not liable to break.

BOX SHOOKS and CLOTH BOARDS.

MFG. BY CHAFFEE BROTHERS COMPANY, OXFORD, MASS.

Clean LIGHT Strong

Shaw's "Victor" Travelers

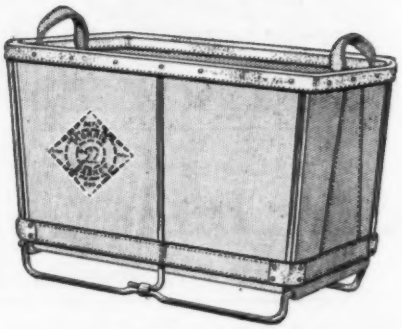
Manufactured by

VICTOR SHAW RING TRAVELER CO.

Incorporated 1899.

23 Sabin Street, PROVIDENCE, R. I.

Morris Spring Bottom Duck Mill Baskets.



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Booklet and Prices.

MORRIS & CO.
Groveville, N. J.

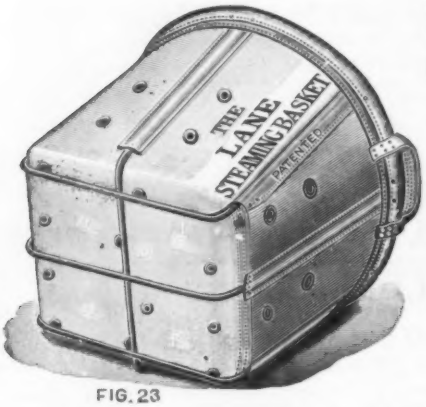

FIG. 23

The Lane Patent Steel Frame Canvas Steaming Basket.

MADE WITH OR WITHOUT WOODEN SHOES, AS REQUIRED.

Adapted to withstand the severe test of steaming better than any other basket, as it is constructed of such materials, and in such a manner as to be unaffected by steam, heat or moisture.

The steadily increasing demand for the Lane Patent Steaming Basket demonstrates the truth of our claims.

W. T. LANE & BROTHER,
Manufacturers,
Formerly located at Port Chester, N. Y. **Poughkeepsie, N. Y.**

He sees the point of his nose

But the POINT we want you TO SEE is that

BALLOU BASKETS ARE BEST

BALLOU CANVAS BASKETS are being used as TRUNKS, SHIPPING HAMPERS and many purposes for which no other CANVAS BASKET could stand, because their construction is radically different and infinitely stronger. Let us tell you all about them in our booklet.

BALLOU POUNDED ASH BASKETS were adopted by UNCLE SAM years ago because it was proven that they stood more wear than any other basket then known. He still uses them. Made of best material known by skilled workmen, and by most improved methods. A trial will convince you.

BALLOU BASKET WORKS, 200 High St., Belding, Mich.

Laminar Sullivan Walrus

ROVING CANS, BOXES, BASKETS. TRUCKS, ETC.

SEAMLESS MANILLA FIBRE ROVING CANS.

FIBRE ROVING CANS AND OTHER WAREHOUSE, STORE AND FACTORY RECEPTACLES.

SOLE PROPRIETORS AND MANUFACTURERS

AMERICAN VULCANIZED FIBRE COMPANY,

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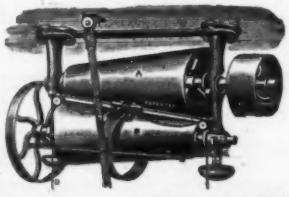
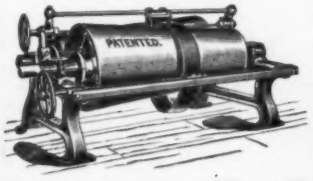
EVANS' FRICTION CONES.

Eight Thousand Sets in Operation in This Country and Europe.

A partial list of manufacturers who have Evans' Friction Cone Pulleys in operation, transmitting from ONE TO FORTY HORSEPOWER: National Biscuit Co., Richmond, Ind., 300 sets. Merrimack Mfg. Co., Lowell, Mass. 20 sets. Arnold Print Works, No. Adams, Mass., 11 sets. John & James Dobson, Philadelphia, Pa., 34 sets. Stinson Bros., Philadelphia, Pa., 40 sets. Frederic J. Falding, New York, N.Y., 30 sets.





Smith & Winchester Co., So. Windham, Conn., 250 sets. Furguson & McRae, Belfast, Ireland, 25 sets. Mercantile Laundry, So. Windham, Conn., 250 sets. Washburn & Moen, Worcester, Mass., large number, all sizes. Dennison Tag Co., Boston, Mass., large number, small sizes. Saco & Pettee Machine Co., Newton, Mass., 275 sets. Pacific Mills, Lawrence, Mass., 13 sets.

Send to **G. FRANK EVANS, 1288 Center Street, Newton Center, Mass.**, for Illustrated Catalogue.

Vulcan Fibre Roving Can.

BODY—Vulcanized Fibre. SIDE SEAM—Rivetcd with Patented Clinched Rivets. RINGS—Tinned Steel, Brazed Joints, Curled Edges. BOTTOM—IXXX. Tin Star Corrugation; Fastened without the use of nails or screws, will not crack, warp or shrink and cannot come out. FINISH—Coated inside and out with moisture proof coating, handsome and smooth. WEIGHT—About one-half pound per inch diameter. SIZE—All cans to any exact size, perfectly round and true. DURABILITY—Superior to any other can.

Also Manufacturers of

HILL'S IXXX TIN AND GALVANIZED IRON DYE HOUSE CAN.

James Hill Manufacturing Co.,

PROVIDENCE, R. I.

THE ONLY SEAMLESS MILL BASKET

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CRANE BROS., Westfield, Mass.

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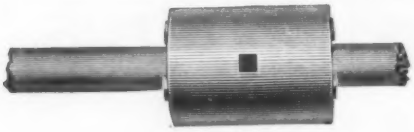
Napping, Shearing and other Machinery

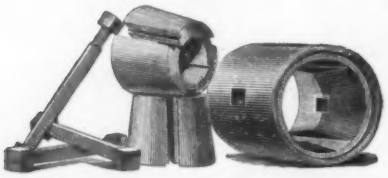
For Finishing Woolen, Worsted, Cotton, Knit Goods, Blankets, etc.

Greene Nappers. **French Nappers.**

Shearing Machines a Specialty.

Special attention paid to Repairing all kinds of Shear Rests and to Repairing and Grinding of all kinds of Shear Blades.





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DOUBLE CONE VISE COUPLING

has a way of holding shafts together, that no other COUPLING can equal.

WILLIAM SELLERS & CO., INCORPD.

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Makers of

SHAFTS,
COUPLINGS,
PULLEYS,
HANGERS,

and all most approved appliances for the Transmission of Power.

SEND FOR CATALOGUE AND PRICE LIST.

MACHINE TOOLS.
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Singeing Machines

FOR ALL KINDS AND WIDTHS OF GOODS.

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Wait and Rye Streets, PATERSON, N. J.

CORRESPONDENCE SOLICITED.

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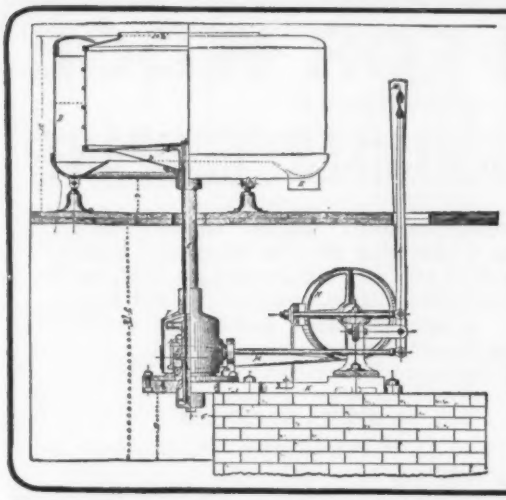
SALEM, MASS.

ELEVATORS

ESPECIALLY ADAPTED FOR MILL USE.

SEND FOR ILLUSTRATED CATALOGUE AND ESTIMATE.



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Special Machines for Acid Work.

SHAFTING, PULLEYS,
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American Tool and Machine Co.,

Incorporated 1864. Founded 1845.

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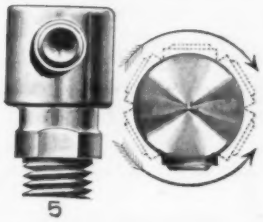

5

DO YOU KNOW

THAT AN OIL HOLE WITHOUT PROTECTION FROM DUST, LINT AND GRIT IS A MENACE TO THE LIFE OF A MACHINE?

TUCKER OIL CUPS

ARE A SURE REMEDY.
SEND FOR SAMPLES AND PRICE LIST.
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Vertical Water Tube

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Built by
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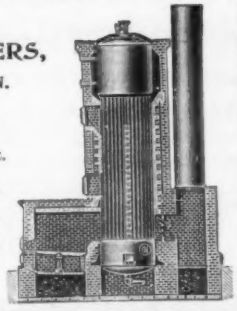

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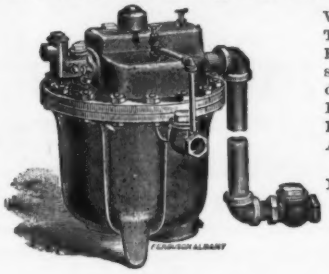
NEW FEATURES: Wearing Parts, Valve and Seat Renewable.



Class A Return Trap

We manufacture Steam Traps for all duties, High and Low Pressures, returning the Condensation back into Boiler or discharging to Hot Well, Tank or Atmosphere.

No Elastic Gaskets, all Joints Ground Metal and Metal.

SEND FOR
Catalogues A, B, and C.

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ALBANY, N. Y.

Established 1870.

FRED'K TOWNSEND, Pres. JAMES H. BLESSING, Gen. Mgr.

RAWHIDE PINIONS

Manufactured By

The Horsburgh & Scott Co.,

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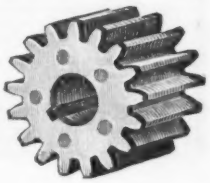

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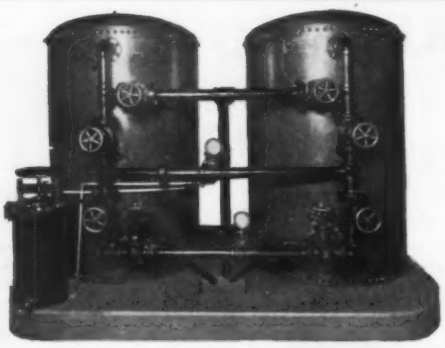

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Our **FILTERS** and **WATER SOFTENERS** are perfect in construction and as satisfactory at the end of one or five years as when first started.

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PROTECT

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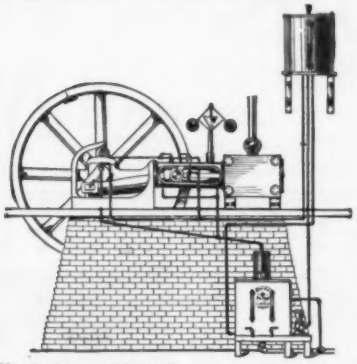

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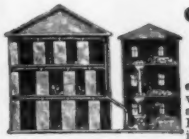

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COSTS ONE QUARTER OF OLD METHODS, LASTS THREE TIMES AS LONG. BELTS CAN BE CONNECTED OR DISCONNECTED, SHORTENED OR LENGTHENED IN A FEW SECONDS. Booklet Explains.

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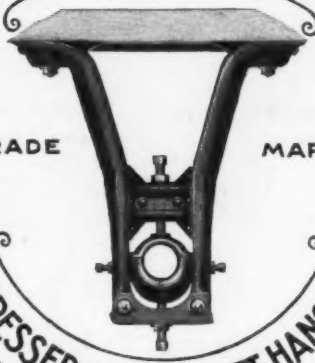

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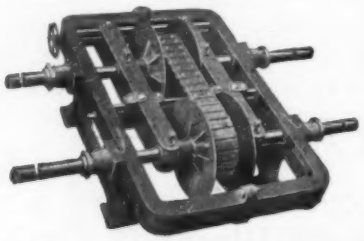

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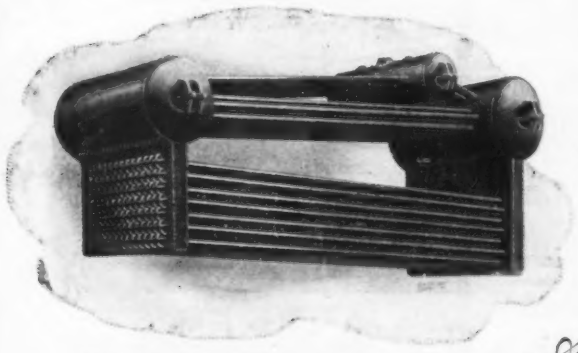

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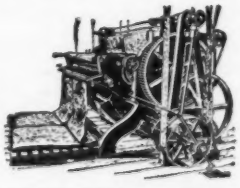

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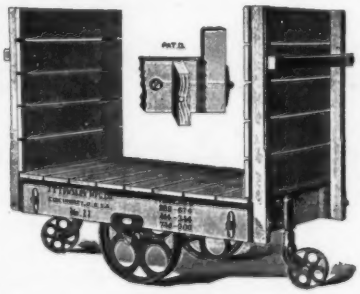

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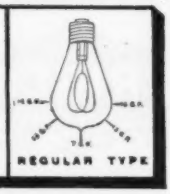

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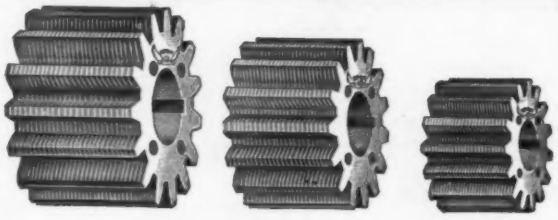

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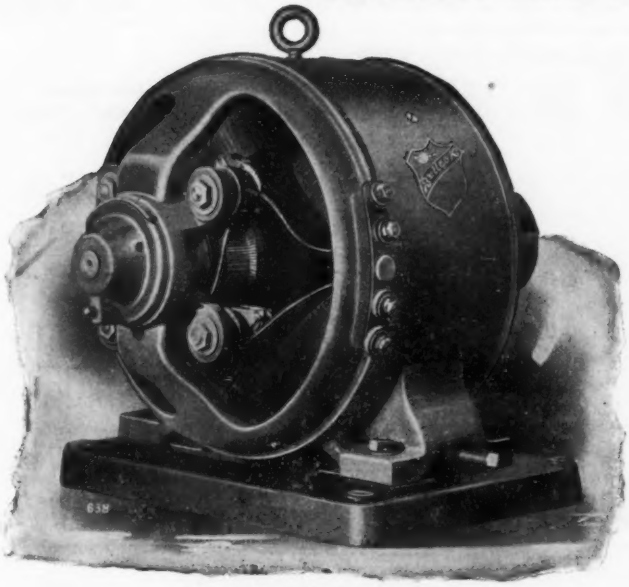

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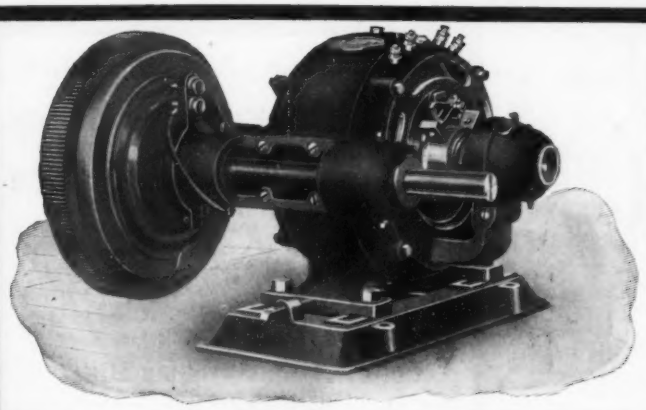

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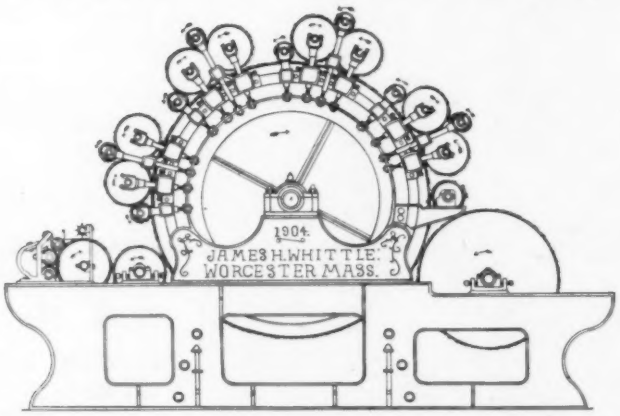

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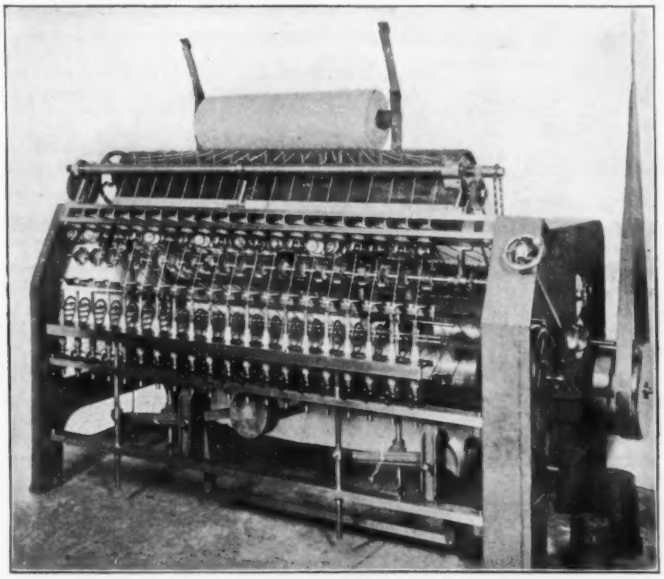

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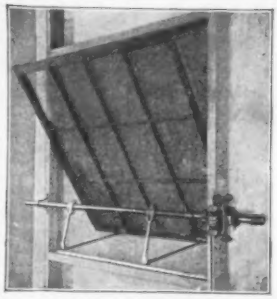

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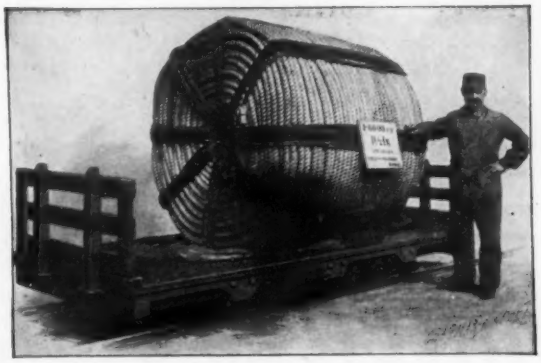

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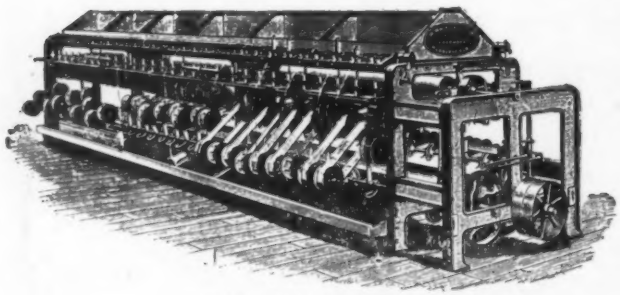

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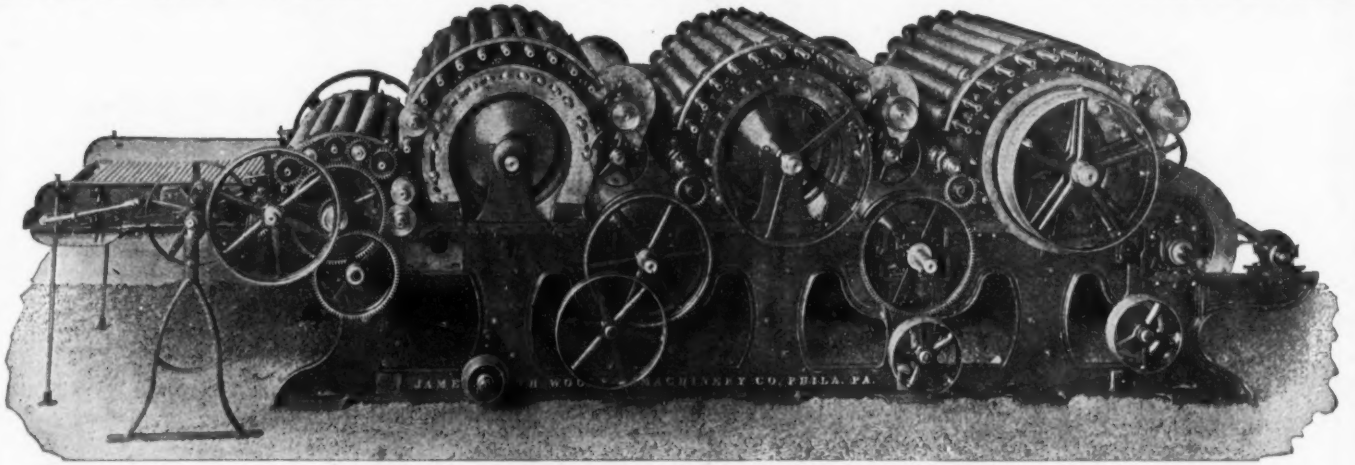

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PART I. Contains a complete directory of all the textile establishments in the United States and Canada. It tells what goods are made, the number of sets of cards, spindles, looms, whether and what they dye or finish, steam or water power, who the selling agents are, the names of the officers, superintendent and buyer.

There are 22 textile maps; gives population of town and railroad connections.

PART II. Is the Yarn Trade Index, containing classified lists of yarn spinners, arranged according to kind of yarn, size and number spun, etc. All the mills with worsted machinery are included in this section.

PART III. Contains Classified List of mills doing order and commission work, also dyeing, finishing, bleaching and printing establishments, classified according to the kind of work done, and so far as possible giving width of goods handled; also shoddy, extract and flock manufacturers and wool scouring establishments.

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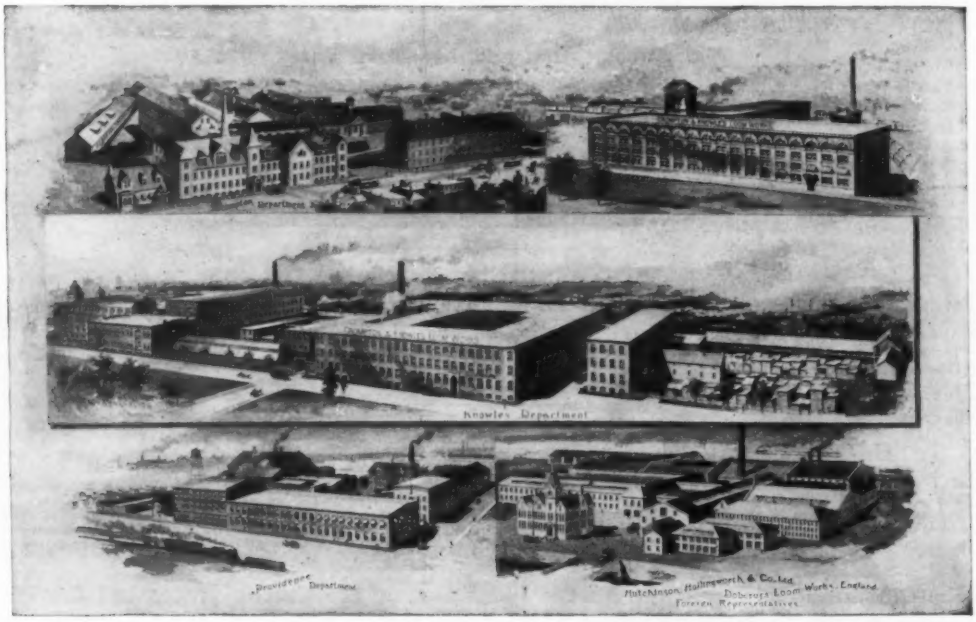

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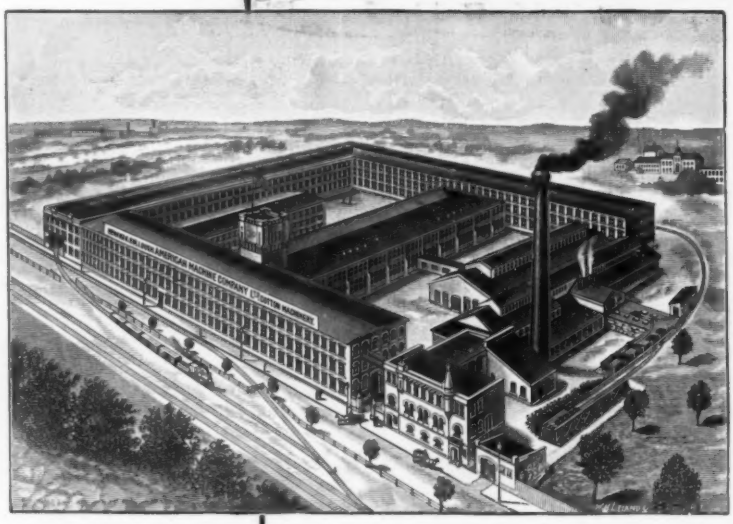

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VOL. 27. (NEW SERIES.) MAY, 1904 NO. 2.

Monthly Comment.

The Cotton Industry in Lancashire.

According to the 1904 edition of Worrall's Cotton Directory of England, just issued, there are in Lancashire 45,195,641 cotton spindles and 653,120 cotton looms in operation. Compared with last year this is an increase of 574,691 spindles and 5,748 looms. Considering the extraordinary conditions that have prevailed in the cotton trade this increase of 1 per cent. is distinctly encouraging. Not since the cotton famine during our civil war have cotton manufacturers been compelled to face such adverse conditions as during the past year. Possibly it is too early for the effects to be seen in the statistics of spindles and looms. The building of a mill is not a question of days, but involves months of preliminary preparation and a long period for the real work of construction and equipment. Probably all of the new English mills reported in the Worrall directory were projected before the crisis in the industry reached the acute stage brought on by 12 to 17 cent cotton. There is certainly no encouragement for new enterprises at the present time in the midst of a curtailment of working time to four days per week. The history of the cotton trade for the last few years proves again that it is the unexpected that happens. Two years ago the English cotton trade was shivering with apprehension over the threatened American peril. Delegations of workingmen and manufacturers were sent here to find out how Americans spun yarn and wove cloth, and since then reports and books have been published to tell the English public how such operations are done here. It was apparently a relief for them to find that yarn was spun on spindles and woven on looms, for there has apparently been a decided restoration of self confidence in England since those visits, and at the present time practically the only trace of the agitation is seen in the use of the word "Americanizing" to describe the adoption of improved methods in English mills.

Although events have not yet justified the fears of two years ago regarding American competition in cotton goods, the cotton trade has been brought face to face with a peril that came suddenly and is far more serious to manufacturers than was the one they feared. The shortage of cotton is a serious menace to the foreign cotton industry and while it affects American mills as well, yet the greater prosperity of this country combined with its possession of the cotton fields reduces the danger to American mills practically to the vanishing point.

The American Peril Again.

Every little while the scare over the "American peril" breaks out in a new spot in Europe. The latest occurrence of this kind took place recently in the German Reichstag. Herr Muench-Ferber, the delegate from Hof, Bavaria, who will be remembered for his vigorous protest in 1902 against the introduction of the metric system into the German textile industry, called attention to the American consular service which was, he claimed, a powerful means of promoting American trade in every part of the world. He contrasted its work with that of the German consuls, much to the disparagement of the latter, and moved that a consular commission be appointed to investigate the German consular service and to organize it into a homogeneous force for the promotion of German interests abroad. The removal of many German textile manufacturers to the United States was cited to prove the need of action. The opinion was expressed that the service contained too many educated theorists and needed the services of practical men with less book knowledge. The Government spokesman, while disclaiming any responsibility and in fact expressing doubt as to the efficacy of the remedy proposed by Muench-Ferber, stated that the ministry had no objection to the appointment of the commission. The motion was then carried, and now we may look for new life to be infused into the German consular service.

In the Swim.

"All those interested in milk production or butter making know that the profit in this line lies in the capacity of the cow to assimilate food and turn it into milk and butter, and the 'can't afford it' granger from 'way back' would look with economical horror at the grain rations that are fed today on an up-to-date farm."

This paragraph in an agricultural paper arrested our attention by its aptness to the cotton manufacturing situation as it is today. The new mills with their up-to-date machinery are constantly enlarging, while the old mills with their old machinery find it difficult to live. If it pays to build new mills and put in new machinery, certainly it would seem to be economy to put in new machinery when the mills are already built, but many of the mill managers who recognize the necessity of getting new machinery, fall back on to the "can't afford it" argument, and drift along, sinking deeper into the slough each year. If it pays to borrow for a new mill, it certainly would pay better for the old mill, as it already has the mill and the help and needs only up-to-date machinery to remain in the swim. Look at the prices for which some mill stocks are selling. Why? Because it costs them more to make cloth than they can sell it for. Why? Principally because they are using old machinery and paying war price salaries for fossilized management.

Cotton Goods in the Philippines.

The share of the United States in supplying the Philippines with cotton goods continues stationary. The report of the imports of cotton goods into the archipelago in November, 1903, is as follows:

Great Britain	43.36 per cent.
Spain	18.16 per cent.
Switzerland	7.59 per cent.
British E. I.	7.43 per cent.
United States	6.18 per cent.
Germany	4.75 per cent.
Japan	4.71 per cent.
France	1.36 per cent.
Others	6.46 per cent.
	100.00 per cent.

Wages in Belgium.

The Belgian government has recently issued a report which shows the low wages earned by the workmen in that country. At Antwerp the average rate for laborers is 75 cents per day; Brussels 60 cents, and in Louvain, 62 cents. In the rural districts the wages are much lower, averaging but 36 cents per day in Brabant. In West Flanders, Limbourg, and other districts laborers' wages vary from 22 to 30 cents per day. Thirty cents is about the average outside of the large cities.

It is stated that the Belgian workman is

satisfied not because the money he receives possesses a greater purchasing power than in England, but because of the low standard of living which enables him to make both ends meet on this miserable pittance.

The Silk Trade.

No exception to the general dullness in textile circles is found in the silk trade at the present time. Manufacturers either have orders sufficient to keep their machinery employed but a few weeks, or have reached the end of their order business and are facing the choice between a shut down and making stock goods. There are few manufacturers who are likely to hesitate between the two courses. Aside from maintaining the mill organizations, the piling up of stock goods offers no advantages, and is fraught with peril to individuals and the trade in general. In the absence of demand the production of goods during the summer means lower prices and a buyer's market in the fall. No argument is needed to convince silk manufacturers that if buyers will not pay remunerative prices for goods to be made to order, they will be still less inclined to do so this fall for goods that are in stock and which must be taken as they are. There is a general and decided sentiment among manufacturers in favor of curtailing production during the summer as the best means of meeting the business conditions.

Mill Inventories.

The fraudulent management of the Bedburg, Germany, Woolen Co., by its general manager, Silverberg, calls attention to a dangerous method of deceiving auditors, directors and stockholders of manufacturing corporations where a large stock of material finished and in process is habitually carried. It appears that Silverberg had complete control of the books and in 1895 began to pad the inventory by an overvaluation of the stock on hand as well as by making the books show a larger quantity of material than was actually in possession of the company.

Although the report of the affair does not so state, the fact that Silverberg's estate has been attached by the mill company leads to the supposition that this padding of the inventory was for the purpose of concealing the abstraction of funds from the mill treasury by Silverberg.

The inventories have been falsified for nine years during which time the stockholders, the public and all officials of the company with the exception of Silverberg were ignorant of the fact that the value of the company's assets was in fact much less than that indicated by the financial statements. The stock of the company sold at a high price and the public bought it freely in the belief that the statements were correct.

The sickness, followed by the death, of Silverberg led to the discovery of the fraud, and the shares fell from 116 1/4 on January 31, to 80 on March 4. The mill books which were under the direct control of Silverberg were found in a chaotic condition, and the method adopted for concealing the deficit made it still more difficult to determine the amount.

This case is of interest to every one owning stock in a manufacturing company. Let the system of bookkeeping be what it may, the accuracy of the balance sheet depends upon the truthfulness of the inventory. Auditors may verify the item of receipts and expenditures, yet in the very nature of things they must accept the weights and measures of the inventory, and to a large extent accept the valuation placed on the stock in the various stages of manufacture. Such valuation must in most cases be determined by calculations involving special knowledge of manufacturing processes, of which the ordinary accountant is ignorant. Again the quantity of material on hand is constantly changing. It is impossible for the auditor to weigh and measure it, and if it were, the amount on hand when the books are audited would not be the same as when the inventory was taken.

It is thus seen that the inventory of a mill is an excellent place for concealing the evidence of fraud and mismanagement. In a large mill, particularly in a woolen, worsted or silk mill where the material is very expensive, large amounts can be added to the inventory

without exciting suspicion. Take the Bedburg case already mentioned: The capital stock of the company was 3,000,000 M. The stock on hand in 1902 was inventoried at 1,652,191 M., and in 1903 at 1,088,977, showing a difference of 563,214 M. in one year. It is, of course, impossible to say at what amount the stock in 1902 should have been valued, but in this case it is reasonably certain that it should not have been in excess of the amount for 1903. In consequence of the exposure, the cost of raw material jumped from 1,469,451 M. in 1902 to 2,891,602 M. in 1903. Here again the exact amount of this increase due to Silverberg's operations for the past nine years is not known with certainty.

The experience of this German mill teaches an important lesson.

The Woolen and Worsted Industry in New Jersey.

The statistics of the New Jersey woolen and worsted industry in 1903, recently issued by the state gives an opportunity to note the changes since 1900, when the U. S. census was taken. In 1900, the product of the New Jersey woolen and worsted mills was valued at $11,579,114, the state standing seventh on the list of ten states, Massachusetts leading with $71,445,467, the other five states, ahead of New Jersey being Pennsylvania, Rhode Island, Maine, New York, and Connecticut in the order named. New Hampshire Vermont and Tennessee stand below New Jersey on this list.

The figures for 1903 show a product of $14,666,962, an increase of $3,087,848 for the three years. The number of mills increased from 24 to 26, and the employees from 8091 to 9111, a gain of 1020. A gratifying increase is shown in the wages from $2,110,429 to $2,926,268. The average wages per operative increased from $261 in 1900 to $321 in 1903.

The Ramie Industry.

M. Felicien Michotte, who has been studying the ramie problem, appeared recently before the French Society for the Encouragement of National Industry and made an interesting statement regarding the present state of ramie industry. He began by saying that as he had predicted ten years ago, no success has as yet been obtained in the chemical retting of ramie. Decortication in the dry state had been considered impracticable by the ramie congress of 1900 in view of the fact that there exists no means of drying the stalks. As for decortication in the green state M. Michotte showed that, although the machines of the present day were very simple compared with those of ten years ago, they are still very complicated, and with the exception of "La Francaise" are adapted only for mill use and have given very unsatisfactory results.

The reasons for the failure are found in the necessity of transporting the stalks from the field to the mill and stripping them. The small production is another difficulty which prevents a production at a reasonable cost. He explained the improvements which have been made to "La Francaise" which now gives a production of 450 pounds per day, the machine costing less than $200. He exhibited many samples showing the excellent results obtained degumming China grass.

The Premium Plan in Business Combinations.

A considerable number of German manufacturers of lining and umbrella cloth have been doing business for some time past under a somewhat novel arrangement. It consists of a premium plan by which a sliding scale of discounts is given to customers at the end of each year, the rate depending upon the total amount of goods purchased from the members of the combination in one year. The rates have been recently increased and under the new list a customer who has purchased goods to the value of $750 from the members of the combine receives at the end of the year a rebate of 1 per cent. or $7.50; if his purchases amount to $25,000 he receives a rebate of 5 per cent. or $1,250. Under this arrangement the rate increases gradually from 1 to 5 per cent., as the purchases increase from $750 to $25,000 per year. The fact that the rebate increases with yearly purchases is an inducement to the customer to confine his

business to the members of the association. The members are bound by an agreement regulating prices, discounts and trade terms.

The Manufacturers' Vote on the Metric System.

Since the vote on the adoption of the metric system, taken last year by the National Association of Manufacturers, the membership of the organization has increased over two hundred per cent., and in view of the importance of the measure, it was decided to take another ballot, the results of which have recently been announced.

A series of nine questions sent to each member covered various aspects of the metric question, such as the call for the system in foreign trade, extent to which it is now used, amount of output supplied to the Government, effect of adoption of metric system by the Governmnt, cost and advantage of changing to metric system and advisability of legislation. Replies were received from 774 members, comprising 422 metal, 104 wood, 42 leather, 69 dry goods, 24 food and 113 miscellaneous manufacturers. Following is a summary of the answers to the four leading questions.

Question 8. Can you recognize appreciable advantages from the adoption of the metric system?

No.....505, 83 per cent.
Yes .....104, 17 per cent.
Non-committal.... 24,

633

Question 10. Should system be adopted in Government departments?

No.....449, 77 per cent.
Yes .....134, 23 per cent.
Non-committal.... 94,

677

Question 11. Should system be made the legal standard?

No.....479, 77 per cent.
Yes .....141, 23 per cent.
Non-committal.... 87,

707

The National Association also invited a number of other manufacturing and commercial associations to poll their members. Following is summary of the replies:

Manufacturers' Associations, 21 against, 2 for.

Commercial Associations, 14 against, 9 for.

Engineering Associations, 7 against, 3 for.

Total 42 against, 14 for.

Many of the members of the National Association expressed their views at length. Following are a few typical examples

AGAINST THE SYSTEM.

Carnegie Steel Company, Pittsburg, Pa.
Amour Plates, Steel Billets, etc.
Use of two standards in the same factory would entail endless confusion.

Wm. Sellers & Co., Incorporated, Philadelphia, Pa.
Machine Tools.
It would involve the abandonment of all our taps and dies, reamers and broaches, jigs, templates and gauges; would require the reconstruction of our drawings and the revision and translation into metrical data of all our experimental investigations. The enactment of a law to enforce its use in government departments would be a great calamity. To make this system the legal standard of the country would be industrial suicide.

Brown & Sharpe Manufacturing Co., Providence, R. I.
Machine Tools.
Cost would probably be a large sum. We can see no appreciable advantage. It would be a great mistake to enact such legislation.

International Harvester Co., Chicago, Ill.
Cost enormous and might easily ruin a smaller concern. Extra cost on goods supplied to government would be 200 to 300 per cent.

Tim & Co., Troy, N. Y.
Shirts, Collars and Cuffs.
Very large cost if applied to all work. Emphatically no.

Thomas Henry Smith, Jamestown, N. Y.
Cotton Spinner.
It would be a lot of trouble and annoyance.

Curtis Mfg. Co., Worcester, Mass.
Woolens.
Great trouble in duplicating machine parts in metric system. Cannot recognize any appreciable advantage.

For the system:

Heller Brothers Company, Newark, N. J.
Files.
Use of the system in the departments of the government would help the cause and it is bound to be adopted by all in the future. This government should appoint a commission to meet a like commission of the English government, so that the change could be made in both countries at the same time.

New Albany Hosiery Mills, New Albany, Ind.
Hosiery.
The system is bound to come and steps should be

taken in that direction. It should be made the legal standard say ten years from now—1907 is too soon.

Bemis Bros. Bag. Co., New Orleans, La.
Bags.
A scientific, uniform system of weights and measures among different nations will undoubtedly foster commerce between them. The adoption of such a system will undoubtedly entail temporary inconvenience. This movement can best be promoted in the United States by government initiative.

Chattanooga Coffin & Casket Co.
Coffins.
We believe that the metric system is the true and sensible one and that we must all come to it eventually, but progress will be and should be very slow.

The metric bill introduced into the House of Representatives last November was referred to the Committee on Coinage, Weights and Measures. At the urgent request of many desiring to be heard, the Committee granted hearings on the bill. At these hearings, which were held weekly for several months, many representative manufacturers submitted statements in opposition to the measure. Before the hearings opened a large majority of the Committee was in favor of the bill which had been favorably reported to the House at the preceding session. It speaks volumes, both for the logical character of the protests presented and for the fairmindedness of the Committee, that a complete revolution of sentiment was brought about, and we are reliably informed that at the close of the hearings there was but one member who favored the passage of the metric bill.

The large majority of the National Association against the adoption of the metric system shows plainly the sentiment among American manufacturers. They do not want to change the present system of weights and measures. From this decision there is no appeal and we trust the well meaning agitators who during the past three years have sought to pass a compulsory metric bill will recognize the inevitable from this poll of representative American manufacturers. The English system of weights and measures is here to stay with the overwhelming approval of the people. The National Manufacturers' Association deserves credit for having supplied such conclusive proof of this fact.

Bargain Day at Leipzig.

In order to revive the trade at Leipzig, which for a number of years has been steadily declining, the proposal was made and recently adopted to have certain days set apart for special bargains. Extensive preparations were made by the Leipzig merchants and the special sale days (Sonder-Verkaufstage) were extensively advertised for a considerable time in advance of the opening. The promises of low prices and an unusually large variety of goods from which to make selections attracted a large number of traders throughout Germany.

The sale continued for several days during the first part of April and reports agree that the experiment was a success. The demand for cotton goods was particularly strong, and this is ascribed to the peculiar conditions now existing in the cotton market. The high cost of the raw material has made it necessary for manufacturers to raise the price of goods. This rise has greatly restricted sales for months in every part of the world. The active demand that developed at the Leipzig bargain sale may be an indication of depleted stocks in dealers' possession and their eagerness to take advantage of every opportunity, real or fancied, for securing bargains in cotton goods.

The success of the sale makes it likely that it will be repeated next year and possibly become a permanent feature of Leipzig's trade. It is simply the familiar bargain sale of our retail stores extended to the wholesale trade. A still further development of the idea is found in the great fairs, such as the yearly fair of Nijni Novgorod, Russia, at which traders from all parts of the world meet and during the short period of six weeks purchase spot goods to the value of $200,000,000, besides making contracts for as much again for future delivery. The success of the Leipzig experiments raises interesting conjectures regarding the extension of this idea to other markets.

In 1801 the United States raised 48 million pounds of cotton; in 1901, 5,384 million pounds.

The Ruin of the Canadian Woolen Industry.

The decision of the directors of the Canada Woolen Mills to sell the property and discontinue manufacturing, calls attention to the desperate straits into which the Canadian woolen industry has been brought by a low ad valorem tariff. The corporation above referred to has 36 sets of cards and 251 looms at Hespeler, Carleton Place and Waterloo, and is one of the leading woolen manufacturing companies in the Dominion. All reports agree that its affairs have been well managed but that the competition of cheap British goods has caused a steady loss for several years. Its troubles are duplicated in every woolen mill in Canada.

W. R. Brock, the president of the company, outlined the situation as follows:

Canadian made woolens suffer from Old Country competition only in the matter of price. One Canadian mill turns out as many different patterns as half a dozen Scotch mills, and the Canadian manufacturers have nothing to fear when the quality and style of the goods are contrasted. The tariff preference, however, has given Old Country manufacturers the opportunity to lay their goods down here cheaper than goods could be turned out from our own factories, and the plants controlled by the company could be kept in operation only three or four days a week, which meant a loss.

Another Canadian woolen manufacturer, made the following statement:

The heart of the trouble is the manufacture of shoddy. The mills in Yorkshire, England, are past-masters in the manipulation of rags, which, by the way, is a clear case of heredity, generation after generation having being employed at the same work, in the same mill, and at the same machines

It is publicly stated in Yorkshire that the mills in the neighborhood of Batley can make a nice looking piece of goods out of a stone wall and a dirt heap with a few rags thrown in to make a continuity.

The clothing manufacturers of Canada naturally wish to present a low priced suit to their customers; and they really cannot be blamed when they get a nice, sightly article, even though it is finished with British dextrine and glue. Of course there is no wear in such stuff; but it sells just the same, to a certain class of trade.

The shut down of the mills in question is simply owing to the manipulation of the raw material, and the change of trade conditions. Raw hands in Canada cannot compete with the past masters of England in the manipulation of shoddy, while the preferential tariff also naturally tells against the Canadian industries.

When the United States had a 40 per cent. duty, under the Wilson bill, fully 18 out of every 20 woollen mills closed down. These plants did not start up again until some time after the Dingley tariff was put in force. This tariff gave the United States market a protection ranging all the way from 60 to 120 per cent., according to the goods manufactured. Now the Dominion Government is asking Canada to do on a 23 1/3 per cent. protection what the United States could not do on 40 per cent.

All this reads like the story of the Cleveland times in this country. The Canadian preferential tariff on British woolens is but 23 1/3 per cent., the rate on woolen goods from other countries being 50 per cent. higher or 35 per cent. The result of this preferential rate has been an avalanche of attractive cotton and shoddy goods from England, sold at ridiculously low prices. Ninety per cent. of the woolens imported into Canada comes from England. These cheap fabrics have invaded all parts of the Dominion and merchant tailors, accepting the fact that the goods were imported from England as a sufficient guarantee of their quality, have been duped with cotton worsteds, shoddy woolens and slazy fabrics loaded and stiffened with weighting materials.

The Canadian consumer has become imbued with the desire for cheap clothing, and the Canadian manufacturers find themselves unable to sell the better grades of goods they have been making or to reduce the quality so as to compete with the imported rubbish.

The ruin of the Canadian mills is still more clearly explained by a comparison of the conditions there with those in the United States. Canada with a population of about 5,500,000 and a woolen duty of 23 1/3 per cent. imports yearly woolen goods valued at $13,702,000, or $2.49 per capita. The United States

with a population of 80,000,000 and a woolen duty at 90 per cent. imports yearly woolen goods valued at $19,500,000 or 25 cents per capita.

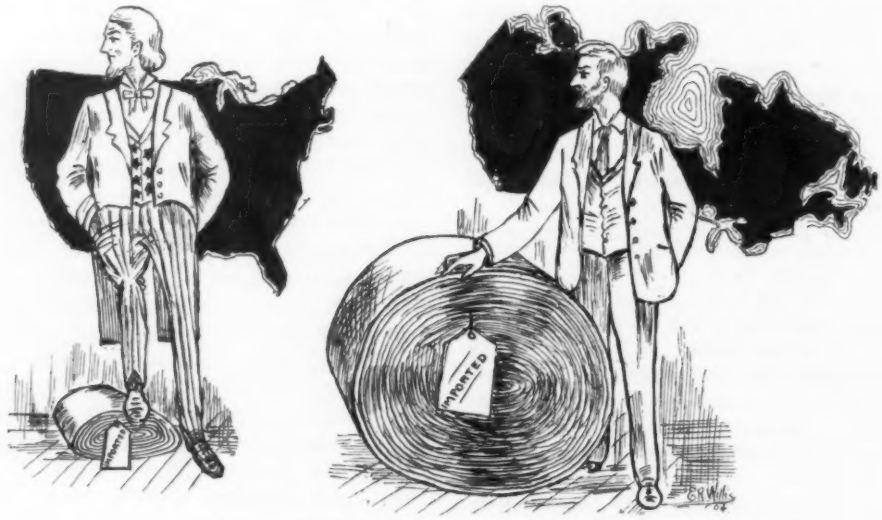
With a population sixteen times as large as that of Canada the value of the woolens we buy abroad is less than one-half more.

Even under the Wilson tariff bill the imports of woolen goods into the United States did not exceed 64 cents per capita, the total value reaching $49,740,000 in 1896. Under the operation of the preferential tariff the imports of woolens into Canada have grown from $9,707,518 in 1899 to $13,702,469 in 1903, an increase of over 40 per cent.

As a result of the low preferential tariff the people of Canada are clothed in foreign goods, while the domestic industry is ruined. As a result of the high Dingley tariff the people of the United States are clothed in domestic goods, the high-priced imported fabrics being a proof of the purchasing power and prosperity of the people.

The value of the woolen goods consumed in the United States is estimated at $316,000,000, of which $297,000,000, or 94 per cent., is made in our own mills. If woolens were coming in at the present per capita rate of importation into Canada, the total imports for the United States would amount to $200,000,000, or nearly two-thirds of the total consumption, leaving but one-third to be supplied by the mills at home. The contrast between the two countries shows the efficiency and value of our high tariff.

There is another important consideration. Our high tariff, specific and ad valorem, is prohibitory on low grade goods, and allows only the high-priced fabrics to pass in, while the low ad valorem rate in Canada means practically free trade in cheap goods. For this reason the disproportion in the woolen imports of the two countries is still greater when rated by quantity instead of value.



THE IMPORTS OF WOOLEN GOODS BY TWO AMERICANS.

Even in the United States woolen manufacturers are finding it difficult to keep their mills in operation, and it is plain that the condition of the Canadian industry must be without hope. The crisis there caused by opening the gates to foreign goods should carry to the United States the same lesson learned here at such fearful cost from 1892 to 1898. Experience is a good school and the experience of others is just as good as our own and a great deal cheaper. Let us "stand pat."

The first provincial congress of South Carolina held in 1775, recommended the inhabitants to raise cotton, but only a little was raised for domestic use until after the invention of the cotton gin.

Seasonable Fabrics.

MEN'S WEAR WOOLENS.

The conditions prevailing throughout the men's wear district are most unsatisfactory and no material improvement can be reported as having taken place during the month. Duplicate orders from jobbers and the manufacturing clothiers are coming in very slowly and the buyers seem to be apathetic about placing further orders until they hear some encouraging reports from their road-men. The outlook seems to promise a better situation within the next few weeks; one of the potent reasons given for the present dullness is the backwardness of the season. The initial orders placed were by no means large and consequently duplicates must of necessity follow in the immediate future. There is no other apparent cause for the present stagnation than the climatic reason mentioned.

DRESS GOODS.

Inactivity and quietness also characterizes the market for woolen and worsted dress goods. Under ordinary conditions no marked activity could well be expected. Taking into consideration the extraordinary conditions which have prevailed, it is not difficult to understand why the demand at present is smaller than usual. The class of goods that are attracting the greatest attention for current wear are the sheer goods, such as voiles, both nub and small jacquard and plain, which are meeting with strong support. Twine cloths and etamine maintain their popularity as desirable fabrics for dressy wear. This class of material is used for waists and shirt waist suits.

Contrary to the predictions of several authorities in the trade, the orders booked for Scotch suitings for fall has exceeded expectations and the request for wool mixtures of this character has been most prominent from the Western and Pacific coast trade. Among the shades most in vogue are champagne, tan and grays, and in the mixed list may be mentioned jasper effects and small checks. Men's wear finish goods, broadcloths, Venetians and the mixtures already referred to will in some sections of the country prevail.

Mohairs are still strong and continue to be one of the favored fabrics for spring and summer wear. They possess many qualities which commend them for all sorts of uses; it is impossible to excel them for dust-proof and general out door wear, the weaves are attractive and the prominent colors continue to be black, navy, cream; also golden brown is a shade fast gaining ground in popular favor.

SILK.

The conditions governing the silk market still continues to show a marked improvement and the situation today is better than it has been for months, with the demand for fancies most prominent. The small, neat stripe effects and small checks are good sellers and soft finish goods on the messaline order in plain colors are making a strong bid for popular favor. The colors predominating are champagne, brown, blues and grays; in checks the coloring most noticeably in request are black and white, and blue and green combinations.

Foulards are maintaining their popularity and are held in high esteem by all the prominent buyers. Japanese silks have had a wide vogue for waist purposes and pongees and Shantungs are in request in considerable quantities for similar use.

WASH GOODS.

Cotton dress materials termed "wash goods" are receiving considerable importance and continue to gain in popularity with feminine shoppers. Such goods as bouretted effects suiting, which at a distance resembles a woolen fabric, have gained the most prominent success among this class of fabrics. The call for fine printed dimities and organdies is one of the features that deserves special comment. Linen suitings are well conditioned, the demand in many instances exceeding the supply.

[In the March issue of Textile World Record, in the article on Seasonable Fabrics, a metallic printed mohair was illustrated as sold by Frederick Butterfield & Co. at 37 1/2 cents. We are informed by this firm that the quotation is not correct; that the goods never have been sold at less than 40 cents and are firmly held at that figure.—Ed.]

French Worsted Spinning.

IX.

BY A FRENCH TEXTILE ENGINEER.

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DESUINTAGE.

There are a number of types of desuinting machines all of which are based upon the same general principles. We will describe only one and select for that purpose that which seems the best, the Malard machine, which was shown at Fig. 8 in the September, 1903, issue. With the opener it forms part of a chain of machines called a scouring battery.

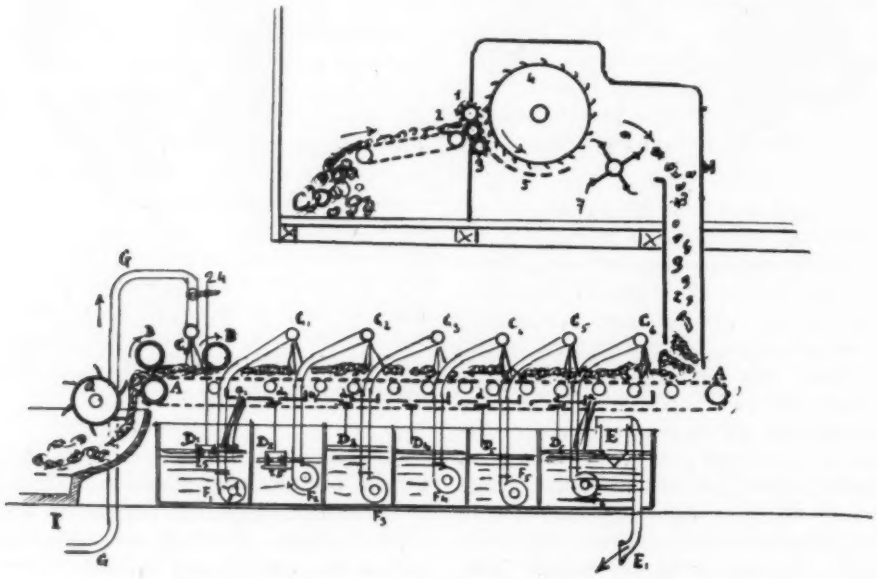


FIG. 33. SECTIONAL VIEW OF THE MILARD SUINT EXTRACTOR.

A cross section of a desuinting machine is shown at Fig. 33. Fig. 34 is a floor plan. The wool is saturated with pure water while spread on an apron and carried slowly from one end of the machine to the other. The water is heated to about 90° F., and forced through seven pipes, C°, C^{6}, placed above the moving apron, A A, on which the wool is spread. Each pipe is perforated with small holes about one-sixth of an inch in diameter and 1 1/2 inches apart. This shower of warm water filters through the wool and apron and drips into the compartments, D^{1}, D^{6}, below which are separated by water tight partitions that prevent the liquor from passing from one to another. Each compartment is connected with a centrifugal pump, F^{1}, F^{6}, which draws the water from the compartment and forces it through the sprinkler pipe with which it is connected. A centrifugal pump forces the pure water through the pipe, G G, and the first perforated pipe, C°, which is placed above the exit of the machine. The hot water from a steam engine condenser can be used to advantage in supplying a desuinting machine. The other pipes, C^{1}, C^{6}, are supplied with liquor from the compartments of the machine.

It is thus seen that the liquor from these different sprinkler pipes does not contain the same amount of impurities. Each of the sprinklers, C^{1}, C^{6}, is supplied with liquor that has already passed through the preceding sprinklers and compartments. Thus the liquor from each compartment is more heavily charged with suint than that from the

preceding one. The liquor from the sprinkler C^6, is the most heavily charged with impurities. It passes into compartment D^6, from which it is discharged through the pipe E^1, into a separate reservoir. The carbonate of potash is reclaimed from this liquor.

As the wool coming from the opener above reaches the apron, A, it is first sprinkled with the most impure liquor, which emits a very bad odor. As the wool advances the water with which it is sprinkled becomes constantly purer, and consequently more efficacious in removing the soluble material in the wool.

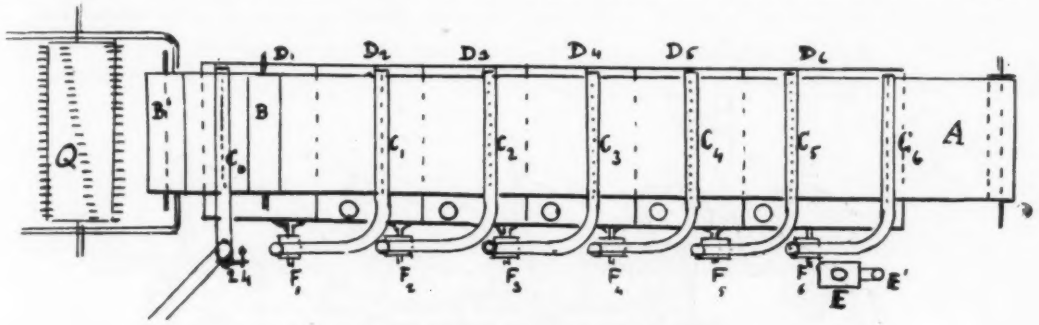


FIG. 34. PLAN OF THE MILARD SUINT EXTRACTOR.

The last pipe, C°, supplies pure water, which removes the last trace of foreign matter from the fibres. Just before coming under this shower of pure water the wool is squeezed thoroughly by the press roll, B, which removes the surplus of impure liquor. After this last rinsing the wool is again squeezed by another roll, B^1, which removes the surplus water. The wool is then delivered from the desuinting machine free from all except the insoluble fatty materials, and falls into the first bowl of the scouring machine.

The desuinting machine serves a two-fold purpose: 1, to dissolve the soluble materials in the wool; 2, to obtain a waste liquor as dense and rich in suint as possible in order that the potash may be extracted at a minimum of cost. This last operation is a separate industry.

The specific gravity of this waste liquor varies from 1.06 to 1.11 and the proportion of carbonate of potash varies from 7 to 12 per cent. of the weight of water. The quantity of pure potash obtained from one pound of raw wool varies from 1 to 4 ozs. according to the condition of the wool. Some small mills do not attempt to reclaim this potash but let the liquor from the desuinting machine run into the river.

It is by no means easy to obtain a liquor with a density of 1.11. Such a density implies the use of not more than one pound of water per pound of wool. By pouring on a small sample of wool in the grease an equal weight of water it will be seen that that quantity of water is scarcely sufficient to saturate the wool. To remove the soluble material with such a small quantity of water it is necessary to squeeze the wool very hard in the presses, then saturate the wool in the same liquor and repeat the operation of saturating and pressing as many as ten times in order to remove the soluble material from the wool and obtain a liquor with a specific gravity of 1.11. This experiment shows the difficulties of the work required of a desuinting machine.

Referring to Fig. 35, which is a cross section of a part of a Malard machine, the water after passing through the wool drops on a table which is fitted with raised edges and forms a sort of pan. This pan is provided with two outlets, a^1 and b^1. The latter, b^1, is the smaller of the two and has a valve, d^2, underneath. The greater part of the liquor escapes by the larger opening, a^1, into the preceding compartment, D^1, while the smaller stream passes through the smaller opening, b^1, into the next compartment, D^2. The smaller table or pan is placed under the next sprinkler, C^2, and the two openings which are of unequal size are so arranged that the

greater part of the liquor passes into the compartment, D^2, leaving the smaller stream running into the compartment, D^3. Each of the other sprinklers is equipped with the pans in the same way except that the one under the last sprinkler has but one outlet which is of the larger size. A floating hydrometer, not shown in the illustration, is in the last compartment. This hydrometer is so connected that it closes the outlet from the last compartment when the liquor is below a certain density and opens it only when the required density is reached.

By the use of the two outlets of unequal size for each pan six times as much liquor passes from the larger outlet into the preceding compartment than through the smaller outlet into the next compartment. By thus retarding the progress of the liquor from one end of the machine to the other it is made to pass many more times through the wool before reaching the last compartment.

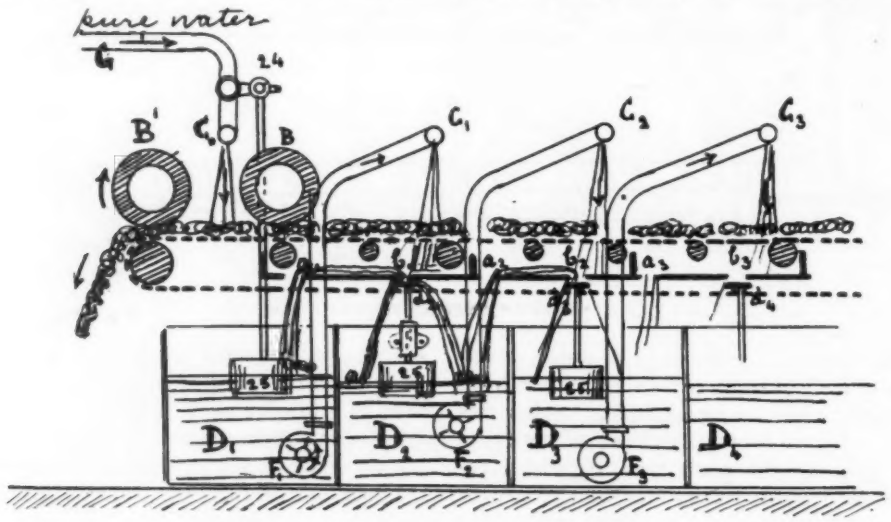


FIG. 35. SECTION OF THE MILARD SUINT EXTRACTOR.

The first pipe, C^0, delivers 3 gallons of pure water per minute. The delivery of the next sprinkler, C^1, is seven times as large, or 21 gallons per minute. Of course the greater part of it returns to the tank, D^1, and is rapidly forced back through the wool into the pan. This is the case with each of the six sprinklers, C^1 to C^6. Each molecule of water passes through the wool seven times for each of the six pipes; adding the first time for the first pipe we have 43 passages of water through the wool. As the first pipe delivers 3 gallons of water per minute it follows that (7×3) 21 gallons per minute is forced through the wool for each of the other six sprinklers. The same quantity (3 gallons per minute) is delivered by the outlet from the last tank as is received into the first compartment.

We have so far assumed that the wool to be treated is heavily charged with suint. The Malard machine will handle 8,400 pounds of grease wool per day of ten hours; this is equivalent to 14 pounds per minute. From 7 to 35 per cent. of this weight is suint. The object is to obtain a liquor containing about 12 per cent. of pure potash in weight. This corresponds to 20 per cent. of soluble suint. As the proportion of soluble suint in wool varies from 7/10 to 35 per cent., and as each pound of water should dissolve 1/5 pound of suint it is necessary to use from 1/3 to 1 3/4 pounds water for each pound of wool. With 14 lbs. of grease wool passing through the machine per minute light wools will require 4 2/3 lbs., heavy wools 24 1/2 lbs. water per minute. It will thus be seen that the necessary quantity of water varies widely. It is regulated automatically and by means of a floating hydrometer in the chamber, E, which

has a free communication with the last compartment, D^6.

The action of this hydrometer affects successively the floats in every compartment and finally the supply of fresh water. Suppose that the liquor in tank D^6 is not dense enough: the exit will be closed by the automatic device in E. This will cause the level of the liquor in the tank to rise. The float, 25, in the tank, D^6, will be raised and this will close the opening in the distributing pan through which the liquor runs into that tank. The level of the liquor will then remain stationary and the stream which is shut off from this tank will be diverted into the preceding tank, D^5, raising the level there until the supply ceases by the closing of the valve. In this way the supply of liquor to the five tanks, D^2 to D^6, will be stopped and the liquor diverted to the first tank, D^1. As the liquor rises in this tank it raises the float and by a suitable connection closes the valve, 24, in the pipe, G, and thus automatically shuts off the supply of pure water. It follows, therefore, that as long as the density of the liquor in the last tank is below the required point the supply of pure water will remain shut off.

The pumps continue to force the liquor through the sprinklers, all of it passing through the large outlets in the pans to the tanks from which it is pumped. This causes the density of the liquor in each tank to increase rapidly. When the required density is reached in the tank, D^6, the hydrometer in the compartment, E, automatically opens the outlet through which the liquor passes from the machine. The level of the liquor falls and the float drops with it, opening the outlet in the pan. This action is repeated in the other tanks and the circulation of the liquor through the machine is restored. The liquor passes through the wool in the Malard machine from 43 to 211 times according to the condition of the wool.

Upon evaporating 1 pound of the liquor having a density of 1.11, about 1/5 pound of suint mixed with oleates and stereates of potassium is obtained. Upon calcining this residue there remains 2 ounces of a white ash of which the composition is as follows:

Carbonate of potash	87 parts
Chlorate of potassium ...	6 parts
Sulphate of potassium ...	3 parts
Silicate, alumina, lime, oxide of iron, phosphoric acid	4 parts
Total	100 parts

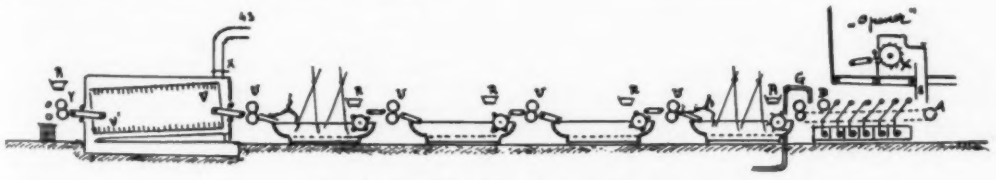


FIG. 36. A COMPLETE SCOURING BATTERY.

The 2 ounces of ash contain, therefore, 1 3/4 ounces of pure potash. The accompanying table shows the quantity of suint or potash in liquor of various densities:

TABLE GIVING THE AMOUNT OF POTASH IN DESUINTING LIQUOR.

Density of Liquor. Pure Water=1.	Density by Baume Hydrometer.	Pure Potash per lb. of Liquor. lbs.	Dry Suint per lb. of Liquor. lbs.
1.000	0	.000	.000
1.009	1	.01	.0166
1.018	2	.02	.033
1.027	4	.03	.05
1.036	5	.04	.067
1.055	8	.06	.10
1.074	10	.08	.134
1.093	12	.10	.166
1.112	15	.12	.20
1.132	17	.14	.233

Following are various particulars concerning the Malard machine:

Speed of apron, A, 2 feet per minute.

Width of apron, A, 40 inches.

Length of apron, A, from point of entry to delivery of wool, 16 feet.

Production, grease weight, 14 lbs. per minute.

Time required for passage of wool through

machine, 8 1/3 minutes.

Potash delivered per minute, 10 to 50 ounces.

Floor space required, 7 ft. 8 in. by 21 ft. 4 in.

Power, 3 H. P.

The machine does not require a special attendant; the man who runs the scouring battery, Fig. 36, can attend to it. Its action is entirely automatic and it will run from morning till night without interruption except when the scouring battery is stopped, which, of course, necessitates stopping the desuinting machine. The wool can be left in the machine over night and during the dinner hour. The wool is therefore removed from the apron, A, only when changing from one grade of wool to another. When the waste liquor is not saved for the purpose of reclaiming the potash a much larger quantity of water is supplied to the machine, say 6 gallons per minute or about 3 1/2 pounds of water per pound of wool.

(To be continued.)

THE CANCELLATION EVIL.

JOHN P. WOOD OF WM. WOOD & CO., PHILADELPHIA, HITS THE NAIL ON THE HEAD.

At the banquet of the National Association of Clothiers in Philadelphia last month the speech of Mr. John P. Wood, of William Wood & Co., was the gem of the occasion, and an illustration of the way in which good sound business doctrine and a sharp hit at existing evils can be presented in such a humorous and tactful way as to be most entertaining and instructive, and productive of good results.

Mr. Toastmaster and gentlemen: After dinner speakers can be divided into two classes—the real thing and the common or garden variety of bluff. The distinguished gentlemen into whose company I seem to have butted tonight belong to the first class and I am the other.

My class is composed of those who are something like a certain sort of vaudeville artists who, by dint of perseverance and hard work, have succeeded in attaining some skill in one particular line of effort, but custom demands that they shall also sing and we who go to witness their efforts sorrow accordingly. (Laughter.)

Now, it happens that in the course of my work I have attained some knowledge of the manufacture of cloth, and by reasons of other circumstances I have been placed in the position of president of the Cloth Makers' Association of Philadelphia. But that gives me no commission to pose before you as an orator.

AN ANXIOUS DAY.

The other morning I received a message from one of my oldest friends, a valued customer, asking for an appointment. I set an hour late in the afternoon when I would see him, and then spent a most anxious day. Ordinary claims can be deducted in settlement, cancellations can be sent by mail and unpleasant explanations avoided, returned goods carry their own message. As far as I knew all of our commercial charitable subscriptions were paid. I could think of no particular reason for the honor of his calling upon me, and I spent a most anxious day. My dinner pail for that day was unopened.

At the appointed hour, with ominous punctuality, my friend arrived and brought with him another well-known Philadelphia clothier, evidently a witness to some expected very unpleasant scene. They came quickly to business and explained their mission, and my worst fears were exceeded. They asked me to come to this notable banquet and speak for the cloth makers. The house was saved, but I, its unworthy representative, was to be made a sort of vicarious sacrifice.

I explained to them my unfitness for the duty, and tried to get out of it. I told them that my sample pieces of oratory always came back with strings in the selvage from end to end, and you know what that means. (Applause.) They told me that much would not be expected from a mere manufacturer, and that I could simply give the company my impressions of the cloth industry.

Then, Heaven forbid! I said, if I tell the truth, they will throw me out; besides, my vocabulary is not equal to the occasion.

INFORMATION ON CANCELLATIONS.

They then suggested that as I was president of this other association, and that as the clothiers had a great deal of difficulty with cancellations and unjust claims and returned goods, that they would like very much to hear from me, how it was the manufacturers of this other association had been able to so successfully deal with this question.

That was to laugh (laughter), because it had only been a few days before in a meeting of this other association that one of the gentlemen proposed that certain measures should be taken to deal with these questions, and he read from a recent issue of one of the trade papers this paragraph: "'The clothing trade, like many others, has always been hampered and annoyed by cancellation of orders, particularly by those cancellations that come after goods have been specially manufactured. Our National Association has finally taken action which has already brought results and which bids fair in a short time to reduce this abuse to a minimum. When a retailer is complained about the secretary consults all members who do business with the party, and if a majority report that he is in the habit of making cancellations or returning goods without proper cause, the board of directors of the National Association gives the retailer warning that if at the end of the next six months his

record does not show that he has mended his ways all the members of the National Association, which comprises 95 per cent. of the leading wholesalers in the 12 great clothing centers of the United States will refuse to do further business with him."

This speaker said that he thought it was about time that the textile manufacturers sat at the feet of the clothiers and learned wisdom.

COMMERCIAL ANARCHISTS.

We all know that commercial anarchists exist among our customers—you know the individual who gives an order, and after you have procured the material and prepared it, and have it nearly or quite ready for delivery, realizes that he could get something cheaper that would answer the purpose just as well, or that he has found something that he likes better.

They would not do a thing to that amiable gentleman in Wall Street, or on any of the commercial exchanges of this country. If, for instance, he bought New York Central stock today and tomorrow found he could buy it cheaper and wanted to renege (laughter), or if he had given an order for wheat to his broker, or had given an order for cotton, or petroleum, or even wool, if you please, and then found he could get something he liked better and wanted to back out, you can imagine what would happen to him.

OTHER KINDS.

You know, too, I suppose, that species who, after placing an order, and allowing you to complete it, cancels it, but neglects to tell you he did so, and allows you to deliver the goods, refuses to take them in, and asks the transportation company to return them to you, with both the outward and inward transportation at your expense.

And then, too, there is another one who says he really did not intend to buy the goods, but that your very persuasive salesman seduced him into doing so.

THIS IS ON ME.

When I think of these various types of cancelers, I am reminded of an eccentric individual in an interior town in Pennsylvania who was always ready to drink at somebody else's expense, and to accept all the cigars tendered him, and allow his friends to pay his railroad fares, but never reciprocated in these little amenities of life. One of his fellow townsmen moved away and was gone several years. He returned to his native town on a visit and inquired of his host about the various things that had happened and what had become of the different people who had lived in the town, and finally said: "What about old Hawkins?" "Oh, he's dead; died about two years ago, and we put up a monument to him; we took up a subscription for it." The visitor said: "I would like to see that very much." They got into a wagon and drove out to the village cemetery and stopped in front of a neat granite shaft. The visitor got out, went up to the monument and read the inscription, which bore the man's name, the date of his birth and the date of his death, and one other single line which said: "This is on me."

THANK GOD, ONE OF THEM IS ALIVE.

These cancellations sometimes are not without their pleasant side. Probably most of you have had periods of a few days in which there were no orders in the mails, and no remittances, and business seemed to be very dull, but at last there came an envelope from some customer and you opened it, and found it was a cancellation. Under these circumstances you probably felt like the neighbor of Abraham Lincoln. He used to tell of a woman who lived on the frontier in Kentucky. She had a very large family and her domestic duties took up so much time that there was very little opportunity for her to give proper attention to the upbringing of the children. She had still, however, a mother's anxiety about their welfare, and as she went about her work they were constantly on her mind. Occasionally she would hear one crying out in the undergrowth, and she would stop her work, lift up her hands and say, "Thank God, one of them is alive."

A BOARD OF CONCILIATION AND ARBITRATION.

My first suggestion is that you must begin by bringing all these bandits who are not in your association into its fold. Take them out of the ways of darkness and evil and bring them into the light of righteousness, and then make these rules effective to work not only forward to the retailer but backward to the mill man. And, seriously, I think it is within the possibilities that some day there may be established a sort of a joint board of conciliation, and I make that suggestion because I know how much at heart your president, my honored friend, Pacificus St. Marks, is interested in conciliation and arbitration through his connection with the Civic Federation, and if we could have such a board to which those cases in which there is a reasonable doubt could be referred, it would go a long way toward correcting those abuses in that end of the industry with which I am more particularly concerned. (Applause).

I think it goes without saying that there are plenty of instances, both in your trade and in mine, in which cancellations and claims are perfectly justifiable, and I do not suppose you intend to oblige the retailer to accept goods or pay for them without allowance where there is merit in his contention, and I do not think the mill men would expect anything different. There must arise a very considerable number of cases in which there can be an honest difference of opinion and conditions where the dictum of one of the parties to the transaction in the present situation of affairs is final, but should not be, is not to be desired.

I think the same spirit which has induced Mr. Marks to take such an active part in the work of the Civic Federation will provide some means for dealing with these cases that arise both between your customers and yourselves and between you as our customers and ourselves. Even when that happy time has arrived I do not think we shall have such an uninteresting and dull a time by reason of the smoothness of things.

TIE THEM TOGETHER.

It will probably be something like the case of the Irishman and his wife who were somewhat given to quarreling, and in one of the more peaceful moments Biddy said to Pat, "Ah, Pat, it's a shame we should be always quarreling with each other. Why can't we be loike the cat and the dog at the stove, as quiet and as amiable as you please?" Pat

replied, "Just tie them together and see how they act." I suppose the very intimacy of our relations precludes the possibility of there being a perfect peace between us.

The clothmaker has acquired a degree of humility which is quite like that of the little boy whose mother found herself with unexpected guests for dinner, and for whom there was not sufficient to provide. Before dinner she said to him: "Now, Johnny, I want you to remember at dinner tonight when you are asked what you will have you must be very modest, because I did not expect these friends today, and we have not nearly as much provisions as needed." So when it came to Johnny's turn his father said: "Johnny, what will you have?" Johnny said: "Just a few feathers, please." (Laughter.)

I know it is a custom among almost all trade industries to think in that other industry things are a little bit better. For instance, when a friend was asked what he was going to have his son do he said he was going to send him to a textile school to make a manufacturer out of him. Bonanzas, however, have a different significance to different individuals. A friend of mine who had invested in a mining company in Colorado was asked by his son what a bonanza was, and he told him it was a hole in the ground owned by a d—d liar.

I feel like the Confederate private soldier that General Longstreet told of. After a long march late in the afternoon the General stopped by the roadside to tighten the girdles of his horse. As he was doing so he heard beside him a Georgia cracker soliloquize in this wise: "I love my country and I will fight for it, and I will die for it; but when this war is over I am d—d if I will ever love another country." (Great applause.)

WHY TEXTILE GOODS SHOULD BE ADVERTISED.

III.

This is the third of a series of papers upon textile advertising by Thomas Balmer, advertising manager of the Butterick Trio—The Delineator, The Designer and the New Idea—the three publications of The Butterick Publishing Company.

1. Necessity and possibilities of textile advertising.
2. Naming and trade-marking textile goods.
3. Planning the advertising campaign.
4. General publicity and work upon dealers.
5. Actual experience of manufacturers whose advertising has been successful.
6. Brief comment upon six different lines which will then be discussed one at a time in the six following papers based upon actual statistics collected at an expense of thousands of dollars and an equal value for the time demanded for their collection.

Does the jobber own you, and consequently the reputation of your goods, or do you and the reputation of your goods own the jobber?

Does the jobber buy your goods because he is compelled to, or must you offer him your goods at prices fixed by him, or by your competitors?

Is your margin of profit large enough to enable you to make your goods of the high quality you would prefer, or must you lower the quality or reduce your profit to meet competition or to secure and keep trade?

Who fixes your prices?

Who owns your trade, that is, the good will of your business—you or your traveling men?

If your traveling men should leave you and go to another house, could they take with them your trade—the good will of your business?

Are you insured against losing trade just as you are insured against fire, death, accidents and bad debts?

Where does the demand for your goods come from—from the jobber or from the consumer?

Suppose the consumer knew all about your goods, liked them, believed in them, demanded them. Wouldn't the dealer be compelled to handle them? Would not the jobber be compelled to supply the dealer? Would not the jobber be compelled to order your goods at your price? Would not your relation to the jobber be reversed? Is this not the natural, safe, logical, lasting flow of trade?

Suppose you brought all this about. Who then, could impose conditions upon you? Who, then, would own the good will of your business?

If the great buying public of this country demanded your goods, your future trade would be assured, market conditions imperative, quality could be as high as you liked, and prices would be of your own making.

Break the shackles that bind your business. Clean off the barnacles that impede its progress.

Advertising is the answer to most of these questions, but to apply advertising to your problem requires special study of your special conditions.

The plan is paramount.

A collection of advertising matter is no more advertising than a collection of building material is a building. Ads are important, but where they are to be used is more so. Bricks are necessary, but the architect decides where each brick is to be put.

A plan must be made for the marketing of

any product through advertising, and that plan is the basis upon which all work is done.

The advertising which appears in the magazine pages is a very important part but by no means all of the plan. The magazine ads are only the first note. The way the inquiries from these ads are handled, the follow-up matter which goes to the customer who is reluctant or hard to convince, the form letters which are sent to dealers calling their attention to the inquiries of customers in their towns, and finally the steady, persistent, relentless stream of printed matter which goes to dealer, jobber and everybody interested, these things you do not see, but nevertheless they are a part of the machinery.

All the machinery which propels an Atlantic liner in five days from New York to Southampton is below the water-line. You see the smoke funnels, the promenade deck, the row of port holes and the rigging, but down in the hold are the engines, the bunkers holding thousands of tons of coal, the steering apparatus and everything else which propels and guides the ship safely from port to port.

So in an advertising plan. The magazine advertising is all above the water-line, but the printed matter, the follow-up matter, the work which must be done behind the magazine ads is below in the hold where it cannot be seen.

No plan of advertising should be undertaken which does not provide an appropriation large enough to see it through. The idea of beginning with a small appropriation and using the profits to increase the advertising never was a sound one, and the chances of its succeeding grow fewer every day.

What would you think of a man who was building an office building, and who had enough money to put up the front hall and one room, and who expected to take the rent of this one room to add another room and so on, building the building from the proceeds of renting the part of the building that was finished? A man who expects to build an office building must have where he can get at it enough money to complete the entire building, and the man who expects to carry on a successful advertising campaign must have enough money to see the entire plan through.

Advertisers have told me that I make it very difficult to begin. Of course I do. I make it difficult to begin because it is difficult.

Advertising of textiles requires hard work, careful preparation and sufficient money, but given these three things the possible results are beyond calculation.

Some months ago a manufacturer came to me who proposed to spend twenty-eight thousand dollars. The appropriation was adequate for his purpose, but on investigation I found that he had no advertising department. He was not equipped to handle the business this advertising would develop. I said to him:

"Spend twenty thousand dollars in advertising and put eight thousand into the preparation of a thoroughly equipped follow-up bureau in charge of a man who knows what to do with it."

Another man wanted to begin with five thousand dollars. He had no trade mark and no way to distinguish his goods from others, but if I would have let him, he would have started and spent that money without a single peg upon which to hang his publicity.

Over against this sort of man is the manufacturer who says:

"I have tried advertising. I went through the whole thing ten years ago and there is nothing in it."

To such a man I say:

"You did not try the advertising of today because the advertising of today did not exist ten years ago."

I don't want to see any textile manufacturer start advertising until he has so planned as to ensure success.

There are three rocks upon which the incipient advertiser is most frequently wrecked. They are rocks to steer clear of in making plans for advertising textile goods.

The first is the single insertion. A single insertion of any one ad, however good or however large, never built a business. The driving into the mud of a single pile, however strong and however securely lodged, never built a bridge.

Advertising is not advertising unless it is cumulative. Advertising for publicity—that is, advertising to give reasons, and arguments, and value and familiarity to a trade-

marked name must be cumulative. It must add impression to impression month after month and year after year.

Sapolio has been advertised continuously, religiously and thoroughly for over thirty-four years, but even with that tremendous momentum it could not stop today without loss to the business.

The stories of advertisers whose success with a single insertion has been such as to inspire them to continue, are few and far between, and their success has done more harm to advertising than any other one thing, unless perhaps it is the statement attributed to Barnum that the public likes to be humbugged.

The second rock upon which too many promising advertising craft have been wrecked is the rock of too small space.

Right here a well known anecdote of Abraham Lincoln is pertinent. One of those people who seem to have a gift for asking foolish questions said to Mr. Lincoln:

"How long should a man's legs be?"

"Long enough to reach to the ground," was the characteristic reply of the president.

And your advertising space should be large enough to accomplish its object.

It matters nothing how much too small the space is just so it is too small on the theory that a miss is as bad as a mile.

If it requires a ten-foot pole to knock down an apple from a tree, a nine-foot pole won't do it. It takes that last foot to make the other nine feet worth something. Nobody knows exactly where the dividing line is between too small space and space that is large enough, but statistics compiled show that for the average new proposition to succeed at least one hundred and sixty-eight lines are required.

But let me ask you who are the advertisers whose names occur to you at once, instantly, without research? They are the people who use page, half-page and quarter-page copy, and they are the largest, the shrewdest, the most successful and the most prosperous advertisers in the world.

The third rock, the one which is both the biggest and the most dangerous, is the lack of proper follow-up matter.

I once asked a manufacturer who tried advertising what results it had brought. He seemed much put out by my question.

"Why," he said, "nothing happened but a lot of letters. We had nobody around here at the time to answer them, so we chucked the whole lot in the wastebasket. That's all the good your advertising does."

This case is not extreme. Some manufacturers seem annoyed that their advertising brings replies without realizing that each one of these replies can be made the entering wedge of a new and profitable dealers' account.

If you are selling goods to the retailer, and every textile manufacturer who expects to advertise must look forward to the retailer as his real customer, you can use replies from customers to the best possible advantage.

It may not be worth while answering letters from inquirers merely to fill the order, but it is worth while as conclusive argument to prove to the dealer that there is a demand for these goods in his town. That is the secret of the success of the follow-up letters. A new account ranging from hundreds to thousands of dollars a year is desirable to any manufacturer. Many a new account has rested entirely upon an apparently aimless inquiry from Mrs. Brown of Camdentown. Her letter has proved to the dealer that at least one woman of importance whom he knows wants the advertised goods. He places the goods in stock on the strength of her inquiry, and then other women buy them, because she first bought them.

These things show how important and how necessary is the right plan, a plan so complete and comprehensive that every detail has been considered.

The textile manufacturer who realizes that there is an asset in a trade marked name for his goods, provided that name is made known through proper publicity, should not venture upon such publicity without an adequate appropriation and a well worked up plan.

THOMAS BALMER.

The first patent for spinning by rollers was taken out in 1738 by Lewis Paul for John Wyatt; Arkwright's patent was not issued until 1769.

Meeting of the New England Cotton Manufacturers' Association.

The seventy-sixth meeting of the New England Cotton Manufacturers' Association was held in the Rogers Building, Massachusetts Institute of Technology, Boston, on April 27 and 28, and each of the various sessions was marked by an unusually large attendance. After the meeting had been called to order, a committee for the nomination of officers was appointed and the report of the secretary read. Charles H. Fish, Dover, N. H., as chairman of the committee having the matter in charge, then presented to Daniel Moore Bates, Wilmington, Del., the Association medal for his paper on the finishing of cotton goods.

An address of welcome was delivered by President Pritchett, of the Institute of Technology. He said in part:

Manufacturing and technical education are so closely related that either ought to be at home in the workplace of the other. For the engineer, in the best sense, is no other than the solver of practical problems. He is the real engineer who solves the problems before him most economically and most successfully with the means at hand. We believe that the training of the school prepares a boy to be a solver of real problems such as manufacture and engineering present.

Ours is a day in which competition is becoming most keen. You have felt this competition keenly in the cotton manufacture and we in the educational institutions of New England are meeting today a competition which is very similar. If we are to retain our leadership and are still to bring to our institutions of learning men from the whole country, if we are to remain national, rather than local, institutions, I believe it is to be as the result of much the same process by which you cotton manufacturers have maintained your leadership in competition with the cotton mills of the South. You have done this by raising the grade of your manufactures, by improved machinery, by intelligent study of your own business, by alertness and initiative, and by providing the best business facilities. If we are to succeed, we must follow the same policy. If education is to be more costly with us, then we must counterbalance cheapness by quality.

The president of the Association, Herbert E. Walmsley, next delivered his address, which was in part as follows:

President's Address.

HERBERT E. WALMSLEY, New Bedford, Mass.

Gentlemen of the New England Cotton Manufacturers' Association:

As President of this Association, and on behalf of the Board of Government, it is my privilege, and at the same time it affords me much pleasure, to extend to you all, individually and collectively, a very hearty welcome to this the 76th convention of the Association, with the earnest hope that our deliberations may be of mutual benefit and advantage.

This great trade, affecting practically every other trade, is not then a matter of concern to those interested in cotton alone; it is of national magnitude and moment; yet today this great and important national asset is, as it were, trembling in the balance, crippled, paralyzed on account of the scarcity of the white staple, face to face with a cotton famine.

No one who engages in a serious study of this question, and who does not, can resist the conclusion, or fail to grasp the fact that we find ourselves and these vast interests confronted with a problem extremely grave in character and far reaching in extent.

In view of the immensity of the interests dependent for their prosperity on the cotton manufacturing industry, recognizing and realizing the urgency of the situation, it is imperative to awaken as wide and general an interest as possible in this truly national question; anything which helps the cotton trade is of immense benefit to the whole community; anything which hinders it is a serious disaster. For these reasons no one can view, without the deepest concern, the perilous position in which we find ourselves; the "dead-lock" should make all thinking men consider very carefully the danger which threatens the industry; owing to the severity of modern industrial and commecrial competition, there is no one who can afford to ignore our trade problems.

That the South with its millions of acres of land, its soil and its climate, so well adapted to cotton growing—unequaled anywhere in the world, so far as at present known—is capable of producing sufficient cotton of the required character and staple to supply the requirements of the entire cotton manufacturing world indefinitely, is indisputable.

The planting and marketing of an increased acreage is necessarily limited by labor conditions; nevertheless, it is perfectly clear that, in developing the resources of the Southern cotton belt, the last thing to be tolerated is the wasting of the resources of these rich lands through the lack of native labor, or of the qualities of efficiency or effort of the colored people; it will be no part of the future conditions that this shall be allowed to prevent the utilization of the immense possibilities and natural resources of that section of this country; the development of those lands is one of the most pressing questions engaging the attention of the cotton world. All else sinks into insignificance when contrasted with the difficulty presented, which difficulty probably accounts, to a large extent, for the present "deadlock."

It is essential to the interests of the United States as producer, manufacturer, and exporter of cotton that the supply from our fields be increased, and its

cost reduced, so as to retain this enormous source of wealth to the United States.

The labor problem will, of course, be solved sooner or later, and it would appear, from what we are told, that the relief may come through immigration from Southern Europe; the growing tendency of Italian immigrants to seek homes in the cotton belt, it is suggested, may be a means of overcoming the difficulty; we are assured on authority that, as growers of cotton, the Italians are in every respect equal, if not superior to the negro; the tide of such immigration will probably flow in that direction if attracted by prospects of betterment.

The economic necessity may become so pressing, however, as to justify and even demand the importation of some form of Asiatic labor; say, for instance, Japanese.

We may be opposed to yellow labor and perhaps nothing but the averting of a positive catastrophe, or of a continued grave industrial and commercial crisis, would justify its advocacy; nevertheless, we must look the situation in the face as we find it, and act accordingly.

It is hardly possible to gauge how much the shortage of cotton and gambling in cotton have injuriously affected the trade; it is utterly impossible to estimate the money loss, not only to the stockholders, but to the operatives, through lack of a sufficient cotton supply; the progress of the industry is hindered and retarded, and business is impeded.

After all, the operatives are the chief sufferers, many of them through short time able to earn barely enough for bare existence, and many others able to earn absolutely nothing through the complete stoppage of mills and machinery. Such a situation is intolerable.

How imperative then it has become that more cotton be grown and marketed so that once more there may be a steady trade with ample employment for all; it has become absolutely necessary to the general welfare to have an increasingly prolific supply from which to obtain the raw material; it is only thus we shall be safe from panics whenever deficient crops are threatened.

Again there is an enormously increased and ever increasing demand for cotton over and above the cotton now being grown; it is perfectly evident that the supply is considerably short of the established demand; this is the serious and impressive fact of the situation; high prices for the raw material are, therefore, plainly inevitable, with the situation intensified and aggravated for the manufacturer by the speculator, and the only possible or practicable remedy is by increasing the supply of the staple.

In passing, I venture to again invite your attention, as I did at Lenox, to the question of a more nearly uniform and maximum labor day in every state in the Union, and which I now take the opportunity of still further emphasizing, and which, it would seem, there should be concerted and determined effort to establish.

Where the law is rigidly enforced and lived up to, as say in Massachusetts, the manufacturers are put to severe and unjust competition with mills and factories in other states wherein longer working hours are exacted, and only the same and in many cases less wages are paid.

If the 58 hour a week law is enforced in the factories and workshops in Massachusetts, it should certainly and in all equity become law in the other states of the Union.

Imaginary state lines are not observed in industrial competition. The 58 hour law in Massachusetts is a detriment to employers and employed here if 60 hours or more constitute a week's work in any other state, 66, I believe, is the average in the South.

The margin of profit in cotton manufacturing, taking year in and year out, is nowadays so small that such a difference as exists in working hours in different states, more especially, of course, as between North and South, is enough to compel a move to the states of longer labor days, or else go out of business.

It may be a long time ere a uniform working day or week is established throughout this broad land, but, when the necessity for it is realized, it is but a question of time when it will surely and inevitably come.

This is a national question and should be discussed calmly, intelligently, and impassionately, without fear or favor.

Among the subjects of vital interest to the New England cotton manufacturer, which with proper attention would tend to solve the problem of constantly recurring periods of depression in textile industries, is that of our export trade in cotton yarns and fabrics.

The advance in the cotton trade to its present magnitude is due very largely to the vast improvements which have been made in mills and machinery, in engineering and constructive operations, which have effected more for the industries and commerce of this country during the last decade than has been realized in any previous period; the rapid progress which is being made is such as to render obsolete methods which a few years ago represented the highest and best practice, and it is necessary to be constantly unlearning or revising what one knows.

Improved tools and labor saving machinery are rapidly rendering the manual skill and dexterity of the individual workman of minor significance; the great industries of today depend more and more upon the successful application of modern discoveries and inventions, and less and less upon the presence of coal, iron and raw materials.

In the industrial race in which we are engaged, scientific knowledge and its ready application to the needs of the manufacturer indicate the direction in which we are traveling.

The marvelous industrial development and unparalleled expansion which have taken place in this country, to a degree never before imagined, are amongst the wonders of the present age, and are apparently only the earnest of the future.

No limit can be set to the possibilities of even the near future; the achievements of the past, extraordinary as they have been, are not improbably destined to be eclipsed at no distant date, and as time goes on.

In the process of expansion which we are undergoing, we are being worked up to a high rate of efficiency in the rivalry of life; the spirit of competition, which brings improvement and activity, is keener today than ever before; the resulting energy, activity, vigor, and enterprise of our people has given us the commanding place we have come to occupy in the world.

With our unbounded resources and unlimited

capital our future advance and progress, if true to ourselves and our traditions, must be steady, with the onward movement of a people conscious of its strength with no doubt as to the final issue, and, in conclusion, I do not hesitate to say that no other race has ever looked out upon such an opportunity as presents itself before our people in this twentieth century.

After the president's address the first paper was read.

"The Cotton Situation."

THEODORE H. PRICE, New York.

It is a very limited phase of the cotton situation that I must today discuss, and that department of the subject which seems to me most germane is the problem with which the American manufacturer is confronted in the apparently abnormal relationship existing between the cost of the raw material and the price of manufactured goods. In approaching this phase of the subject, it is well for us to bear in mind that the increasing quantity of cotton consumed in America as compared with that which is exported, puts our American manufacturers in a position of increased advantage as compared with the one they held a generation ago. Today America consumes approximately 45 per cent. of the cotton she produces.

A generation ago the American consumption was hardly 25 per cent. of the cotton produced here. Under these conditions the American manufacturer is, of course, increasingly independent of European competition in the sale of his goods so far as our home market is concerned, and to that extent is collectively the master of his own commercial destiny. The increased American consumption of cotton and the manufacture of cotton has, on the other hand, its disadvantages. There is no country in the world in which the population is, in times of prosperity, such extravagant buyers, and there is in consequence no country in the world where the reaction from prosperity to hard times and from extravagance to economy is so acute.

It follows, therefore, that the elasticity of the American demand for cotton is probably greater than that of anv other community in the world, and as conditions of instability are always disadvantageous to organized industry, it seems to me that one of the great difficulties with which you, gentlemen, are confronted, is this very elasticity and uncertainty in the demand for the product of your industry. Such a situation in the goods market we are now apparently facing. It has become of late a theory of mine that in America the extravagant habits of our people induce in times of prosperity the purchase of shirts, sheets, frocks and tablecloths, as the case mav be, which, assuming that prosperity were to continue, would be used let us say, for one year, whereas, if these purchases were made at the end of a period of prosperity, the succeeding depression and its forced economies would lengthen the life of the same shirts, sheets, frocks and tablecloths by 50 per cent., or say to eighteen months, thus diminishing by 33 per cent. the demand for cotton goods in the succeeding year.

In no trade that I know of is the operation of the law of supply and demand as speedily or as plainly evident as in the cotton trade. The very compressibility and completeness of its statistics, and the fact that the crop must be moved from the plantations to the mills before it is consumed, enables one almost to "mark time," so to speak, with the progress or the retardation of the demand. A celebrated English statesman is said to have remarked that there were three forms of untruthfulness, "the lie, the damn lie, and statistics," but it is almost impossible for me to avoid here giving you a few figures. So far as the cotton trade is concerned, statistics are not misleading if dealt with with due regard to the nature of the facts of which they are the exponent. The mistake, in my opinion, that is made by most students of cotton statistics is. that they are assumed to be of a prophetic rather than of a historical nature. Statistics are not prophetic; they are simply a record of facts, but we cannot read the future except in the light of the past.

The light crop movement at present is regarded as indicative of a complete exhaustion of Southern supplies. I am not here to indulge in doctrinaire assertions of opinion, but I would call your attention to the fact that oftener than otherwise the course of the market which is, so to speak, the finger upon the dial that indicates the tension of the demand, shows that relatively small receipts of cotton are more likely to reflect an absence of demand than an exhaustion of the supply. Upon no other theory can the course of the market during the last sixty days be explained. Its great advance was during the period of large receipts. These receipts resulted from the previous purchases of spinners.

Your own purchases, gentlemen, for in the last analysis you, or the demand for manufactured goods which you represent, are the arbiters of prices. Under present conditions of handling and transportation in the South probably at least a month upon the average, elapses between the day upon which cotton is bought at the South from planters or the country merchant in a little interior town upon spinners' orders and that at which it appears at the outport and is counted as a portion of the receipts from day to day. Probably ninety days elapse between the time at which cotton is similarly bought for export and its disappearance in the mills of the European manufacturer. It follows, therefore, that the influence of prices upon the movement is not apparent for from thirty to ninety days after a preknowledge of the situation has actuated the mind of the ultimate buyer, namely, yourselves, and it is for this reason that I refer to port receipts as historic rather than prophetic in their value as a guide.

The season which is coming to an end is a case conspicuously in point. The single influence that had more effect in engendering this year's great speculation in cotton than any other was the Government report of December 3rd. Cotton did not pass twelve cents a pound for middling until the third day of December, the date of the Government report. At 12 cents a pound we were told that spinners could not and would not buy except on a very reduced scale and yet during December receipts and shipments to the mills continued on a scale which enabled the advocates of higher prices

for cotton to say, with apparent truth, that at 13, 14 and 15 cents the demand for cotton was unchecked.

The truth, however, became apparent in about 30 days, and since the first of January the receipts have shown rapid diminution, while the exports of cotton since that date are the smallest on record for the past ten years and over 1,000,000 bales less than they were during the corresponding period last year. But, watch the action of the market, which, as I said a moment ago, is the dial hand which marks the intensity of the demand. The speculative impulse that it acquired sufficed to carry prices to over 18 cents for the July position in New Orleans on the 1st of February, when despite the commencement of the rapid falling off in receipts prices began to decline and have since that time intermittently tended toward a lower level.

It is obvious to my mind, and I think it will be to yours upon reflection, that prices advanced in the face of large receipts because spinners were buying, and that the large receipts represented cotton which had been bought and was being shipped to them, and that prices declined in the face of small receipts because you gentlemen had stopped buying and the speculative demand, which is necessarily anticipatory of what will be your action, was not able to support the market.

The afternoon session opened with the reading of the following paper:

Preparation for Mill Management.

RUSSELL W. EATON, Brunswick, Maine.

The proper course of training for a young man who intends to become a lawyer, physician, minister, journalist or civil or mechanical engineer is fairly well defined and acknowledged. No well defined course of training for one who intends to be a manager of a mill has yet received general approval. This is not because the profession is uncertain in its requirements or lacking in its financial rewards or light in its duties. On the contrary, the requirements are fairly well known, the emoluments compare favorably with most other professions and the duties are arduous. With the rapid growth of industrial enterprises in recent years, the requirements, emoluments and duties have also grown, and it may be due to the short time that these great industries have existed that no settled and permanent course of training for them has been outlined and generally accepted. Whatever may be the cause, has not the time now come for a more careful examination of the qualifications needed by one occupying such a position, and the determination of the best means for acquiring them?

Let us then endeavor to outlive some of the more important qualifications. A mill manager is placed in charge of very valuable property which must be safe guarded, kept in the highest possible state of efficiency, improved as experience may direct and employed to the fullest extent, and he is to direct and control the work of many people so that the output of the plant shall be the maximum in quantity and quality. He is the holder of a valuable financial trust and the captain of an industrial army. For the performance of his duties he needs first to realize his obligations to the owners of the property and to the workmen who have placed themselves under his direction and control. No man can be a successful manager who uses the interests intrusted to him as a means primarily to his own enrichment or the power he holds over his employees as opportunity for oppressive treatment that he may gain prominence. With this, he must have the strong, positive determination to succeed and I place as the prime requisites, undivided loyalty to his trust and a fixed determination to succeed. These two qualifications are fundamental.

A mill manager should be thoroughly acquainted with the processes required in the operation of the plant. He should be prompt to see where improvements can be made and, as far as lies in his power, make them. He should be able to select suitable men for the oversight of each department, treat them fairly without fear or favor, and observe that they in their turn do the same by those under them.

He should not be easily discouraged by accidents or misfortunes. He should be quick to decide those questions demanding immediate answer and careful in action when large interests are involved.

All these requirements come readily to our minds. The list might be considerably enlarged, but let us take them as illustrative of all. Loyalty and honesty, determination to succeed, self-reliance, familiarity with the work, ability to discern improvements, selection and government of men, courage, decision, caution. With these requirements in mind what training will best develop them in a young man?

It is my belief that loyalty and honesty must be born in the man, that no subsequent training will ever put them there. The determination to succeed comes from struggle, and nothing else will develop it. The pampered child knows not the pleasure of striving and winning. This requisite is so pre-eminent that we sometimes feel that no great leader can be reared in ease, that no mill manager can be successful in his business who has not already had struggles to overcome. A college course often develops this desire to succeed by the competition of the class room, and the athletic field. One gets a taste of the joy of winning which will lead to further endeavor. We must not, however, minimize the great good to a man that may come from struggling against and conquering adverse financial conditions in youth.

The important factor of self-reliance comes properly from knowing and knowing that one knows.

This leads to our next item, familiarity with the processes of manufacture. A mill manager must know the business in its details if he is not to be dependent on others. This is too self-evident to need amplification. But he ought to know not only these details, but the general laws on which they are founded. To know how other men in the past have been doing things, and how these are now being done, is not enough. He should understand why. He should know the reasons, the general broad principles of physics or mechanics on which the best methods ultimately rest.

From this broad knowledge, only, will come the ability to discern improvements. I believe it is safe to assert that the most valuable improvements

have been suggested or devised, not by those most closely connected with the operations, but by those whose general or broad knowledge has enabled them to apply new principles of construction or action. Here I would plead for a young man's training which shall be broad and not specialized.

The same general principle applies to the selection and government of men. Nowhere will breadth of knowledge be more useful. The present chaotic condition of the labor world with the undefined relations of capital and labor ought not to exist. I believe they would not so exist if in the past all directors of labor had been properly trained as to the respective rights of each. A captain of industry needs a trained mind in order to lay out a safe line of action. He must learn by associating with the workmen what are their points of view and he should also have the benefit of the wise teaching he can obtain in the schools.

Let us now consider the elements of courage, decision and caution. While we must admit that these qualities are inherent rather than acquired, still they can be strengthened by proper training. This strength will come by their exercise and the opportunities should be commensurate with the young man's abilities. They will first show in small things and grow with the growth of the boy. As a young man let him have fellows of his size for competitors and young men's problems for his decisions. So let his character be developed to enable him later to meet unflinchingly the sterner problems of life. To start with a boy just breaking into young manhood, to see his mind gradually unfold as he realizes little by little the large world in which he lives, with its great men to emulate and their deeds to study and admire, to see his thoughts broadening in the schools, to see him assimilate this knowledge and steadily developing his individuality, apply all his acquired strength to his life work and advance to honorable position, is to see the finest of all sights.

I am not prepared to admit that the life of the business man presents less opportunity for achievement than that of other professions. The management of a great enterprise like a cotton mill requires the continuous exercise of qualities which in other professions leans to honorable mention. Therefore I heartily believe in the broadening and strengthening influence that can come from college training, and especially in a small college, where the immediate connection with his trained instructors and the contact of the young man with his equals, out of the class room as well as in, gives a training that cannot otherwise be acquired. But, essential as I believe all the results of college training to be, I know that the young man who intends to be a mill manager must become thoroughly acquainted with the machinery, the processes and the workmen. The life and spirit of the work must become as natural to him as the air he breathes. To govern men he must come to know them, he must be a part of the system along with them, sympathizing with their feelings and looking at problems with their eyes and from their point of view. Is it possible to do this after a young man has come to the age of 23 or 24? And, if not, then at what point should the young man be taken from school and placed at work and what work should he be set to do? If we cannot give him all the schooling that we would wish, without robbing him of the desired practical experience and if we cannot put him at work at the right time without withdrawing him too early from school, how shall we choose?

It was with such questions as this seeking answers that I took the liberty of sending circulars to about 200 of our members with this query: "If you had the direction of the education of a bright boy, fourteen years of age, just through the grammar school, who wanted to become a competent mill manager at thirty years of age, what course of study and work would you lay out for him? I am desirous of knowing how long you would send him to school and particularly if you would send him through college." The accompanying sheet provided blanks to be filled indicating the point at which the boy should be taken from school or college, or Institute of Technology, also the number of years, if any, that he was advised to spend at a textile school, a mill office, machine shop, machine builder's work, mill engineer's office, cotton broker's office, and the various departments of the mill.

The replies began to come very early. They were from treasurers, agents and superintendents, from small mills and large ones, from North and South, also from a few machine builders and a few educators. I think the list is representative of our membership.

I received replies from 119 members and I take this occasion to thank these gentlemen for their kind attention to my circular letter.

Many replied that the subject was "too hard," "too deep," "a great puzzle," etc., or that they did not feel qualified to give the advice desired, and seven therefore asked to be excused from replying.

Of the 112 remaining, I have endeavored to carefully collate the replies and I present them below without further comment.

I find that six advise the boy to leave school at the end of the grammar school course.

Of these, three would have him then enter a textile school for three years or more, while three members, whose success in manufacturing certainly entitles their ideas to much consideration, would then put the boy at work and keep him at it without further schooling. Six members advise the boy to leave school before the end of the high school course, two advising it after two years and four after three years. All but one of these recommend a two or three years' course in a textile school.

Of the 100 remaining who advise a full high school course 5 would then place the boy at work; 17 would send him to a textile school; 29 would send him to college; 49 would send him to an Institute of Technology.

Of the 29 who advise a college course, I find that eight would then send the young man to an Institute of Technology for at least two years.

Fourteen would advise his attending a textile school, the time recommended varying from one to three years, and we have two respondents who advise one or two years in an Institute of Technology and two years in a textile school after leaving college.

Of the 49 who advise entrance in an Institute of Technology immediately following the high school, I find 29 prescribing a short course varying from one to three years and followed in twelve cases by a one to three years' course in a textile school.

The remaining 20 recommend a full four years' course in an Institute of Technology and eight follow this by one to two years in a textile school. It is interesting to note that 59 members recommend attendance for more or less time at some textile school.

Summarizing the replies, I find that in three cases the boy is advised to leave all school at 14 years of age, one at 15 years, two at 16, two at 17, seven at 18, one at 19, nineteen at 20 years, ten at 21, thirty-one at 22, fourteen at 23, eleven at 24, five at 25 and five at 26 years of age. These figures are based on the time ordinarily required to obtain the schooling recommended. In fact the age of finishing school would be higher because eleven advise the boy to work at least one year in the mill or machine shop between the high school and later study. Several advise that vacations be employed in this way and five recommend Textile school study nights or by correspondence while employed in the mill.

Of the further division of the young man's time, I find that 54 advise office work ranging from six months to three years; 56 advise from 3 months to 4 years in machine shop; 28 advise from 1 year to 4 years in machine builders' works; 42 advise from 6 months to 3 years in mill engineer's office; 25 advise from 3 months to 1 year in cotton broker's office.

As to the various departments, I find that 45 recommend the most time to be spent in the carding department and 19 in the weaving, while others do not lay especial stress on any department.

In addition to the topics mentioned in the circular I find many valuable suggestions. Two gentlemen urge a year of travel to manufacturing centres at home and abroad, several emphasize the advantage of experience in a good business office and a year in the inspection department of the Factory Mutual Insurance Companies is brought to our attention.

As there is great difference of opinion as to the advantage of a college training I take the liberty of quoting from the replies on this point.

From those opposite I quote: "Higher education or culture will not meet its affinity or find the atmosphere inspiring in the average mill village."

"My reason for omitting the college course is that I think it is better for a young man not to go through college if he is going to run the average cotton mill on account of the class of help that is coming into the mills at the present time."

"I think that a young man who anticipates being an agent of a cotton mill would be wasting his time by spending four years in college."

"A high school or college education tends to make the majority of men feel above the practical part of the business."

"A college course would be superfluous."

"I think that a college course would be of advantage to a man on the social side rather than in performing the technical duties of mill management."

"Would leave out the college course. Boys always do the best who start work early in life. The habit becomes formed and is not so irksome but rather a pleasure."

"Some boys would receive great benefit by taking the entire college course while others are positively harmed by so doing."

"The college course might help the individual as a man, but not as a mill manager."

"College gives a man a polish which he can obtain in no other way. It also broadens him. But in my opinion college education is not essential and the four years required for it can be more profitably spent in the mill."

"A college course following the high school course would be very desirable, if after such a course the young man would be willing to begin at the bottom and work up. I think this process is rather too slow for most college graduates. Everything else being equal the one who has been through college has the advantage of the other fellow."

"If a boy is studious and conscientious and uses his time to the best advantage it is a benefit to go to college. If he goes there and spends his father's money and works only just enough to pass his examinations his college course is a curse to him. He forms habits of extravagance and laziness."

"There is no way to train a boy in the humanities of life except by putting him in contact with the humanities. Every college has an artificial atmosphere. This is a very wholesome and excellent atmosphere for a youth, but it is wholly different from the big, aggressive and uncompromising business world."

"Many of our best mill managers of today never went further than the grammar school. Different cases need different treatment. A college education does not make a fool of a man, it only develops the fool that is in him. Neither does college education make a man. It simply develops his manhood."

"The mill is the college I should send such a boy to, and if physically fit I should send him at sixteen years of age."

From those in favor of college training I quote: "If the boy has means and time he certainly should finish his college or institute course." "I would have him the graduate of a college without regard to future occupation." "He would at least have an education. Personally I should place a college education above everything." "Granted that the boy is bright and with a turn towards mechanics, with energy and strong physical health, I should by all means advise his completing a college course." "I favor no specializing during the college course, but rather a broad election of academic studies." "My main point is the importance of the college training and that of the textile school, both of which should be as broad as possible." "I would give him a liberal classical course, as I believe it broadens the youth and better fits him for an all round man than any other education which he could take." "He would at least have an education which would enable him to succeed in some walk of life. I would place a college education above everything."

"As a young man cannot have too much genuine education, I would recommend a college course if he could afford the inevitable delay before settling down to work; and if his college career comprised actual work and not the gratification of social ambitions and amusements."

One who recommends a full college course to be followed by a post graduate course in a first rate technical school says: "Under existing conditions in this country the time required for this is two

years too long and costs too much. . . . At twenty-five he will be behind the so-called 'practical man,' at thirty-five he will be way ahead of him with a better knowledge and a quicker aptitude."

A noted textile educator who recommends a four years' course at the Massachusetts Institute of Technology writes: "It might seem as if the four years spent at the Institute might be considered a waste of time, but my experience is that not only is this valuable on account of the general knowledge obtained, but that it induces in a young man systematic methods of approaching any problem, gives a breadth of thought and a mental training and accurate judgment both of men and affairs which cannot so well be obtained in any other way and reduces the time necessary to be spent later to grasp the needed knowledge."

I also take the liberty of adding the following remarks from the many received, which bear upon the general topic. "One of the most, if not the most, important considerations a good mill manager should possess is the ability to deal with people, and if the young man should work in the mill he would have a chance to develop this quality. I am a thorough believer in the fact that the knowledge required in actual working conditions is of great importance, but I do not believe it is necessary for a man to be a successful operative in any department to be a successful manager."

"Let him hustle until the time comes, as it surely will, when a position opens for a young man, with technical education and practical training, and what is more, one who has proved his ability to stick, stick, stick."

"So much depends upon the boy himself, his ambitions, natural talents, etc., that I think it would be necessary to watch his progress and develop his training accordingly."

(This same idea is expressed by a large number of writers.)

"The first great requisite is a natural ability to manage help. I would impress upon him that the way to rise is not by continually thinking of a better job to come, but rather to do every job he comes to better than any other man can do it."

"A competent mill manager should have a good business training and perhaps two years could be profitably spent in securing it. I consider good business training essential."

"Under an efficient leader I think a young man can learn from the office end some of the most important elements which enter into the making of a good mill manager."

"In no case allow him the privilege of working all over any one department; have him learn thoroughly one thing at a time, then take a position and be responsible for the results." "There is one thing which I doubt if a man can acquire, i. e., the ability to judge men and when he has made a selection of his subordinates to keep them loyal and get out of them cheerfully their best efforts."

"I should prefer to have a boy start in a small mill rather than in a large corporation."

"I do not consider it necessary for a young man to attain the age of thirty years before he is capable of managing a mill."

"The first thing I would want to be certain of would be the fact of his having a mechanical turn of mind."

"I care not how much theoretical knowledge he may possess. Without something of inside experience it would be up hill work."

The subject of the paper, the proper training of a mill manager, led to an earnest discussion, in which various opinions for and against a college training were expressed. All the speakers apparently agreed on one point at least, namely, that natural ability was the prime requisite for a successful manager, and that without this quality, training would never make a boy competent to run a mill.

The next paper on the program was, The Origin of Sewing Cotton, by James Clark, Chapel House, Paisley, Scotland, a subject which has already been treated by Mr. Clark in this magazine.

An interesting paper by Gen. Draper on the spindle situation was then read.

The Spindle Situation.

GEN. WILLIAM F. DRAPER, Hopedale, Mass.

Mr. President and Gentlemen: When invited to present a paper at this meeting on the subject of spindles, I was inclined to demur, on the ground that this subject has been fully discussed by myself and others at your meetings before. Mr. Jacob H. Sawyer, the inventor of the Sawyer spindle, my respected father, George Draper, and others interested in the introduction of the Sawyer and Rabbeth types, have recounted their advantages, and explained their construction and operation, in great detail. Various gentlemen interested in competing structures (now largely or entirely obsolete), have presented the subject from their respective points of view; and I personally have prepared and read at least two comparatively elaborate papers, one on "The History of Spindles," and another on "The Development of Rapidly Running or Yielding Bearing Spindles."

Since what I am saying is largely historical, I will not omit mention of the Draper family in this connection. They have furnished much of the inventive talent that has perfected and combined the ideas of the inventors named, and scores of others; they have perfected the processes of manufacture of the various parts, to a point far beyond anything before attained; they have conducted the litigations; harmonized differences of interest; made long and costly scientific experiments, to ascertain underlying principles; and introduced the perfected structures to the manufacturers of the world. But for the mechanical judgment, self reliance, and unlimited energy of George Draper, some of the most important of these spindle inventions would have become abandoned experiments; and his successors have greatly perfected the structure, and carried the work of introduction commenced by him, to a satisfactory conclusion.

It is but seldom that any improvement of a radical character comes into general use during the life of the original patent, as did the Rabbeth form of spindle, as perfected by the Draper Company. The reasons for the great success in this case are: First, the enormous value of the improvements (which I have endeavored to state, approximately, in previous papers); second, the low royalty col-

lected, in comparison with the gains from their use; third, the actual saving of money in equipping a mill with these spindles, as compared with an equipment of the old kind, for the production of a given amount of yarn. The present spindle produces substantially twice as much yarn, on the average, as the spindles in use in 1870, while the cost of the present machines, royalty included, would be only ten to fifteen per cent. greater with the rapidly running spindles than with the old slow running ones. This means, and has meant, a heavy saving of first cost in equipping a new mill; as well as a larger proportional saving in the cost of running afterwards. The fourth reason was the generally intelligent and appreciative attitude of the cotton manufacturers of this country toward new improvements, when their value has been demonstrated. Some, of course, were timid and slow, there have always been such men, but the larger number welcomed, and let us hope are still ready to welcome, a real improvement of a substantial character.

As before stated, the saving in first cost made introduction comparatively easy in new mills; and the competition of the new mills made a change in the spinning machinery of the old ones necessary.

After a lifetime largely spent in the introduction of improved processes, I have come to the conclusion that there are three stages in the adoption of any real improvement that has enough energy and financial backing behind it to insure it a fair trial:

First. The stage of experiment and perfection,—the overcoming of mechanical difficulties, and the troubles incident to the use of any new device;

Second. The stage of adoption by the enterprising, who cheapen or improve their production, while their competitors keep along in the old ruts, or try to find a "cheap and nasty" substitute;—and

Third. The stage of general adoption, when the most conservative are driven either to adopt the new thing, or to maintain a higher cost or a poorer product than their more far-seeing competitors.

Anyone who has done business as long as I have with you, Gentlemen, can judge without asking, who will be the first to try an alleged new improvement, and to adopt it if its claims are substantiated. He will know who will seek another way to approximate the desired result, and who will wait till a large introduction shows the device so perfected that there is no risk in buying it, and that there is a certain loss in waiting longer. He would also know, as I have learned from the introduction of the spindles under consideration, that adoption is only a question of time with you all, if the new machine possesses merit, and is sold at less than its value to you.

I come now to a consideration of the spindle business as it exists in this country at present. There is a temporary lull in the demand, owing to the disturbances in the cotton market; but more spindles will be wanted, as surely as more cotton cloth will be wanted. New mills will be equipped, and old machinery will be replaced.

Meantime a change in conditions will be brought about by the expiration of an important patent next month,—the Sherman patent. I am sorry that it does not last longer, from personal reasons; but as regret is unavailing, I have thought it might interest you if in connection with this statement an announcement were made of the policy which the Sawyer Spindle Company and the Draper Company propose to pursue under the circumstances. We have considered the Sherman invention an important one, though the Sherman spindle proper, as unmodified by others, has not of late years been one of the popular types, we having sold during the past three years more than twenty times as many of the Whitin type, and more than fifty times as many of the Draper-Rabbeth. Our price has been substantially the same for all three forms,—$1.05 each to manufacturers for Draper and Sherman of standard size, and five cents each extra for the Whitin, and an addition to cover cost in each case for larger sizes, making allowance for old spindles, and also a commission to builders. Of this $1.05 we have considered 45 cents as royalty, though out of this sum have come the expenses of litigation, experiment, and the purchase of improvements, or alleged improvements.

We at first thought we would furnish Sherman spindles at the old price, less the royalty, or 60 cents, but as we are fitted up to make them economically, we have decided to go still farther, and make the price of the standard size 40 cents each. Any party who desires will be at liberty to make and sell these spindles after May 24th, provided they do not make changes in them so as to infringe our other patents; but we doubt if anyone can afford to fit up so as to make as good a spindle of this type as we shall furnish, at this price.

On our other forms of spindle, valuable patents are still in force. On the Draper spindle we control the screw step arrangement,—the Day spring, the Woodmancy doffer guard,—and various improvements in locking and packing, as well as in other directions. On the Whitin we control the special fit of the bolster in its case, and the Woodmancy doffer guard before mentioned. The McMullan spindle has full patent protection for several years to come. We shall reduce our prices on all these forms substantially, though we shall still charge a considerably higher price than we do for the Sherman; and we believe that at the prices we charge they will be materially cheaper than even the Sherman at 40 cents, in the long run. The exact differences in construction, and the patents which cover them, I will not go into here and now, for the reason that I have noticed a tendency to make my published remarks a basis for argument in patent litigation.

I cannot leave the subject without referring to a recent improvement made by Mr. Rabbeth, the inventor of the yielding bearing spindle, which we think will prove of great value, and we believe that manufacturers who adopt it will find it worth several times its cost.

As spindles and bobbins are now made, the bobbin is driven by the contact of its tapering inner surface with the tapering exterior surfaces of the spindle and whirl. There are two of these so-called frictionally adhesive bearings; one near the top of the spindle and bobbin, and the other near the bottom of the bobbin, on the exterior surface of the whirl, or within a cup attached to the whirl. As spindles are run, it is seldom that both bearings are effective, and most manufacturers depend on one only. In practice even one does not seem to be certain in action, as an examination of any frame of spindles carrying nearly full bobbins, will show. A

large part of the bobbins will be found loose, in such an examination, and in that case there is a tendency to rise on the spindle, which must mean a more or less uneven twist in the yarn.

Further, owing to the shrinking and swelling of the wooden bobbins, there is a large variation in the height at which they stand on the spindles, particularly in the case of filling bobbins, which are wet more or less in the operation of conditioning the yarn for weaving, and hence swell and shrink unevenly. Half or three-quarters of an inch is not an extraordinary variation in height for these bobbins in spinning, and that means a traverse half or three-quarters of an inch shorter than is necessary, —a large reduction of the amount of yarn on each full bobbin,—and waste made from winding too high or too low on bobbins that vary in position more than the amount allowed for in setting the traverse.

Referring only to the less amount of yarn on each full bobbin, made necessary by this defect, it is evident that it causes more frequent doffing and greater cost for doffing,—a greater cost of spooling warp yarn, and more knots (a great disadvantage), —more frequent changing of filling bobbins in the loom, with the additional work for the weaver which that implies,—and also an unnecessary number of blemishes in the cloth, there being a blemish in cloth woven on most looms at every change of filling. We shall have something to say on this subject later, in another connection.

Still further, if the bobbin seats itself firmly on one or both of these adhesive bearings, or is crowded down, as is frequently done to prevent loosening, its removal to piece an end, or in doffing, becomes difficult, and spindles are bent every day in your mills in wrenching them off. I need not enlarge on the disadvantage of bent spindles; —they mean bad spinning and serious cost for repairs.

To overcome these troubles, Mr. Rabbeth has made a centrifugal drive, consisting of loose pieces attached to the whirl, which allow the bobbin to be put on or be taken off the spindle freely, when the spindle is at rest; but which spread by centrifugal force, and drive it by engaging its inner surface, when the spindle is in motion.

I repeat: When the spindle is still, its bobbin is perfectly loose, and when it is in motion the bobbin is sure to turn. This overcomes the trouble of uneven twist, caused by the loosening and rising up of bobbins as they are now driven. The bobbins in the new construction all come down to shoulders on the whirl, which stand in a horizontal line. This insures the same vertical position of all the bobbins, and enables the traverse to utilize their full length, instead of a considerable percentage less than their length, as now. The bending of spindles in doffing or piecing ends, will also be eliminated.

Still another point is worthy of mention. The new construction enables us to make a much more solid bobbin at the bottom, and to avoid to a great extent the operation of reaming bobbins, which is so troublesome in mills. The loose fit, by the greater leeway which it allows, ought to prevent reaming entirely, but so much water is thrown on filling bobbins, in some cases, that some reaming may still be necessary. It will, however, certainly be less necessary, and in many mills may be avoided altogether. We feel sure that the bobbin bill will be greatly lessened where this new drive is adopted.

Taken together, these advantages are enough to secure a considerable economy in spinning, as well as better work, and we believe that the improvement producing them is destined to come into universal use. We have tested the new device in quite large numbers, in various mills, and on coarse and fine work, and its performance seems equal to its promise. Orders have been received for many thousands of them, and we are prepared to furnish them with either the Draper, or Whitin, or MacMullan spindles, at a reasonable extra price. We are also prepared to furnish spindles having whirls with centrifugal clutch, to replace or repair those now in use, it being unnecessary to change the other parts of the structure.

It is important that spindles of a given type should be, mechanically speaking, of one length, and that the points shall be true and round, and of the same taper, so that they will fit in the centres of the grinding machine. The old process of making these points was to cut them in a lathe with a chuck and tool. Our present process, above explained, is to grind the blanks between two emery wheels, which make them much nearer uniform in length, and in perfection of the bearing points. We can also leave the spindles harder, as it is not necessary when the points are ground to anneal the spindles, as is done when the points are made by a turning tool.

Beyond these patented points, our machines leave much less to the judgment and skill of the operator, and as a consequence the spindles produced are nearer uniform in diameter, and average more nearly round. As a result of all these advantages we have been able to make our spindle inspection materially closer, so that a very large percentage of spindles which formerly with the ordinary process we accepted and put into use, would today be thrown out, for various irregularities and variations from standard, while all the present spindles are materially stiffer, and have greater capacity of bending without setting.

We have also perfected our machinery and processes in making the cast iron parts of the spindle structure; also our assembling; to the end that standard sizes shall be maintained, and imperfect parts discarded.

We do not think it possible that anyone using only the ordinary tools can make spindle structures as perfect mechanically, or as well fitted for their work, as ours; and though the Rabbeth principle will allow of the running of more or less imperfect structures, such spindles will run less steadily, break more yarn in spinning, and come to repair quicker.

TO SUMMARIZE:

1. The manufacturing community owes to the initiative of our company the introduction of the Sawyer and Rabbeth spindle inventions, which, as perfected, have halved the cost of spinning

2. Important features are still protected by letters patent, and we shall supply the trade with spindles embodying them, at reduced price. The spindles that we have sold of recent years are of this character.

3. We commend to your examination and adop-

tion the centrifugal bobbin clutch that I have described.

4. We propose to furnish the Sherman spindle, which will soon become public property, at a price that should be attractive to manufacturers that are satisfied with something short of the best.

5. We do not recommend it, even at that price.

6. We have expended much ingenuity and large sums of money in perfecting our mechanical work in this direction, and believe that these expenditures will show themselves in our production,—whether of the dearer or cheaper spindles.

In closing I desire to thank you all for your intelligent co-operation in securing the universal adoption of these wonderful developments of the machine which

"Draws and twists a thread,
Without the tedious toil of human hands."

There is still room for great advance in the textile industry, and some such advances are being brought to your attention. I hope you will maintain the same progressive attitude toward them that you have shown heretofore. In this way, and in this way only, can America maintain the lead she has taken in improving and cheapening processes in all machine using industries.

The next paper was entitled:

Advantages of Rope Transmission in Textile Plants.

FREDERICK S. GREENE, 65 Wall Street, New York City

If there is one place above all others where rope driving predominates over either belt drives or electricity, it is in textile plants, and especially in the modern cotton mill.

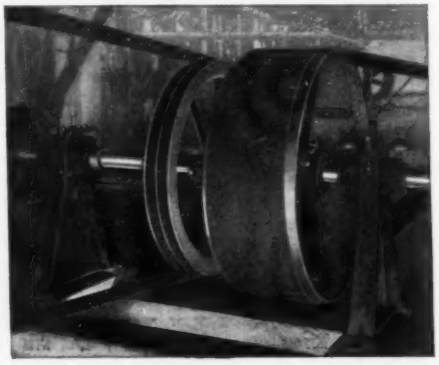
Electricity as a means of transmitting power for extreme distances and in scattered plants, particularly in mills where all the machinery is not in operation continually, possesses advantages paramount to all other methods. But in well-balanced cotton mills, such as our engineers are designing today, where the pickers are so numbered as to keep the cards in operation, they in their turn to supply the spindles, and finally the spindles to produce just sufficient yarn to keep all looms at work, —electrical transmission has not yet reached a sufficient stage of perfection nor economy in installation to justify its adoption.

Economy, therefore, is the chief advantage of a rope drive over electrical transmission, but when compared with belt transmission there are a dozen or more points in favor of ropes. Those which apply particularly to textile plants may be summed up as follows:—

The distance and direction in which power may be transmitted is practically unlimited. There are many rope drives now in successful operation where power is carried with economy a distance of from 200 to 500 feet. Where shafts are neither in the same line nor plane, by properly placing guide sheaves, power may be transmitted by ropes around corners, from one building to another, and in short, between any two shafts, no matter how situated.

Economy of space. The width of rim surface required for rope sheaves is from ½ to ⅔ that of the width necessary for belting, according to the size of rope used. The supporting bearings may, therefore, be placed much closer for a rope than for a belt drive, an advantage that the practical mill man will recognize as of prime importance.

The accompanying cut is taken from a photograph of a rope and belt drive now in operation. Here two 1¾ inch diameter ropes are transmitting 80 H. P. to the shaft, while the belt drive, immediately alongside, is doing but 75 H. P. The difference in space occupied by the two pulleys is an eloquent advocate for ropes.



THE RELATIVE SPACE FOR ROPE AND BELT DRIVE.

Rope drives are noiseless. This fact is due to the flexibility and lubrication of the rope, and to the air passage under it in the groove. There are many cotton mills in this country whose engines are developing from 1,000 to 2,000 H. P., where the faintest sound in the engine room can be distinctly heard, therefore the slightest irregularity or disarrangement in the running of any part of the engine can be detected at once.

No electrical disturbance is produced. It seems hardly necessary to explain to cotton spinners what a favorable point this is for rope driving, as the electricity generated by belts has always been one of the most serious troubles in textile manufacture.

No loss power from slipping. Where the diameter of the rope sheaves is sufficiently large, and the angle of the groove properly turned, so that an air space is left under the rope, it is wedged so firmly in the groove that loss of power by slipping becomes a factor too insignificant to be considered.

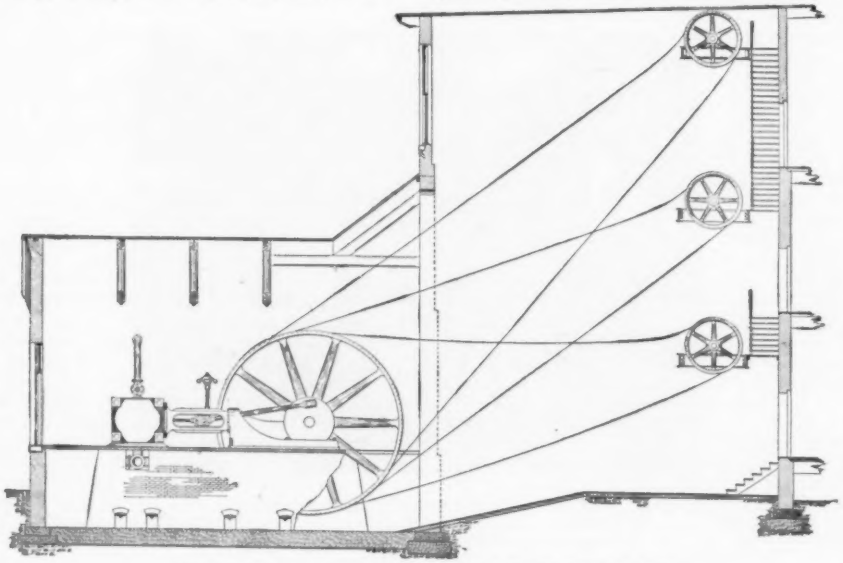
Transmitting power to different floors. As power in all modern cotton mills is transmitted to three or more floors, the advantages of rope driving for such plants is undeniable. The full number of ropes start from the driving sheave, while the number required for each different shaft are easily taken off at the several floors.

Economy in first cost and maintenance. In drives of 200 H. P. and up, where shafts are more than 30 feet centres, the cost of rope drives, as compared with belt or electricity is much in favor of the former. The advantage increases rapidly as the distance apart of shafts and the amount of power increases.

To arrive at an approximate cost of the maintenance of rope drives is a difficult matter, as it depends almost entirely upon the manner in which the rope is spliced upon the sheaves, and, where a good transmission rope is used, upon the ability of the man in charge, to let the ropes take care of themselves, and to refrain from coating them with all sorts of injurious preparations. The average life of rope on the main drive of a cotton mill, where the multiple or English system is used, is from eight to ten years, during which time, the entire cost of maintenance should be confined to the labor required to take up the slack in the ropes once, or at the most twice.

When estimating the maintenance cost of an electric drive, it is well to bear in mind that the equipment installed today is almost sure to be antiquated six or seven years hence. There are cases of record where mills were refused insurance until electrical apparatus, put in but five years previously, had been replaced by appliances of later date.

To make a comparison of the first cost of the three forms of transmission, we will take, for example, a three story mill developing 1,000 H. P. as shown by the accompanying cut which is from designs of a cotton mill now in operation. The engine wheel is 21 feet in diameter, 70 R. P. M. The three driven sheaves are each 64 inches in diameter; 400 H. P. is taken off at the third or spinning floor; 400 H. P. at the second or carding floor; and 200 H. P. at the first or weaving room. Nine 1¾ inch ropes are carried to the two upper shafts and five ropes to the lower, as against two 40-inch and one 20-inch double belts.



MAIN ENGINE AND DRIVE FOR THREE-STORY COTTON MILL.

If this arrangement may be criticised on the score that the belts are wider than strict necessity requires, it must also be admitted that the amount of work allotted to the ropes is equally conservative, for each rope is doing a little less than 44 H. P., whereas the printed tables of some of the most prominent manufacturers of rope driving machinery give 65 H. P. as the amount of work to allow for a 1¾ inch rope running at 5,000 R. P. M. In making this comparison the writer has endeavored to follow as nearly as possible the methods used by successful mills of recent design.

For the rope and belt drive above described we have the following table of costs, due allowance having been made for material wasted in splicing in both cases. The prices for both rope sheaves and belt pulleys were quoted by one of the largest machinery manufacturers of this country.

The effort to determine the cost of an electrical

RELATIVE COST.

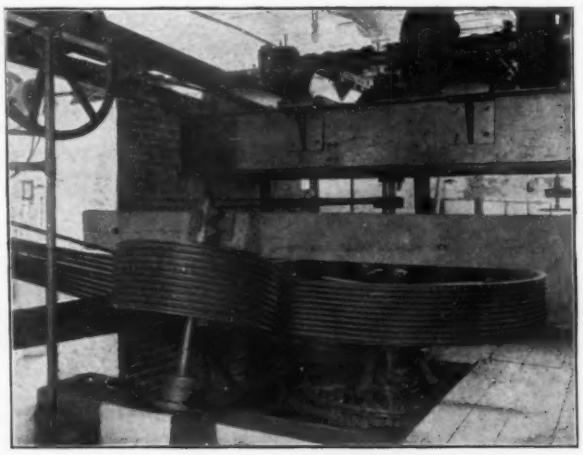
1,000 H. P. BELT AND ROPE DRIVE.

ROPE SHEAVES.	BELT PULLEYS.	TRANSMISSION ROPE	LEATHER BELTS.		
Driver 21′ dia. 23 Grooves. 3 shares 64″ dia.	Driver 21′ 3 pulleys 64″ dia.	1¾″ diameter.	2 ply.	Total Cost of Rope Drive.	Total Cost of Belt Drive.
$4,400 00	$4,050 00	$541 48	$1,949 14	$4,941 48	$5,999 14

Width of RIM for ropes 58 inches; for belts 102 inches.

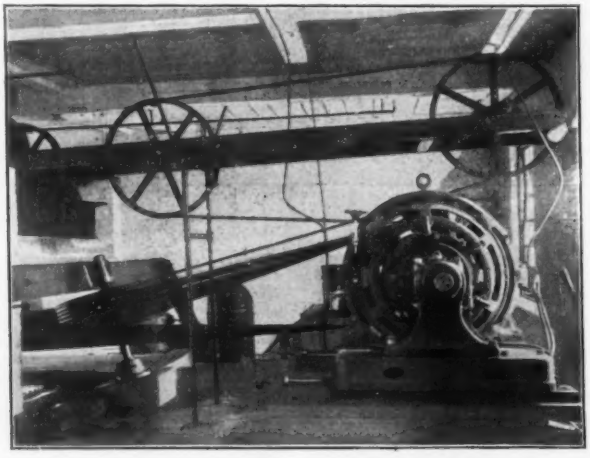
transmission for the above mill has not been entirely satisfactory to the writer, for each concern applied to for figures has recommended different arrangements for the motors,—some advocating that the power be divided into units at many points, necessitating the use of a large number of small motors. But the cheapest arrangement that will meet requirements satisfactorily, seems to be to place two 200 H. P. motors on the second and third floors, with two 100 H. P. motors on the weaving floor. These six motors, together with a 750 K. W. generator, switch board and other necessary appliances, amount to a total of $25,400.

It would hardly seem necessary to go beyond these figures to prove the advantage of rope drives over either belt or electricity at the present time. We are told by our electrical friends that the day is coming when each picker, card, spinning frame and loom will have its individual motor, but from present costs we are forced to the conclusion that this day is in the far distance. And even were the question of cost not so important, the advantage of running individual machines in a cotton mill would not seem of great moment, for the writer is assured by successful cotton mill men that under present conditions a mill must be well balanced, and all departments in continual operation, to insure its success from the standpoint of dividends.



DRIVING SHEAVE AND DEFLECTING IDLER.

On the banks of the Savannah River in Georgia, stands a cotton mill which is driven by electricity, the power being rented from a company which develops it at a dam located about one mile further up the stream. In this plant the entire power is brought to a central motor, from which it is transmitted by ropes to the different floors. This mode of handling the power has proven economical and entirely successful. Now if it has been found advantageous to drive with ropes from one motor, avoiding small units, even where your electricity is



TENSION CARRIAGE AND DEFLECTING IDLER.

generated by a water power, how can we be made to see the economy of generating electricity by steam and carrying it to a number of costly motors when both generator and motors are under the same roof?

It is not the purpose of the writer in this paper to enter that field of contention, as to which of the two systems of rope driving is the better, the multiple or continuous. In his opinion, both systems have their place—and the place where the multiple system shows to best advantage is from the main drive of a cotton mill; though should it be necessary to design a vertical, quarter turn or other complicated drive, of course the continuous system should be employed, regardless of the character of the plant.

As an example of the flexibility of rope driving with the continuous system, the accompanying cuts are presented. These illustrate a drive recently installed in a woolen mill in this state. The distance between centres is but 16 feet, it being impossible to procure more room in the building. And in this short space, a quarter turn drive is transmitting 200 H. P. from a vertical waterwheel, running 205 R. P. M., to the horizontal shaft of an electric generator with a velocity of 579 R. P. M. The actual distance between the circumferences of the driving and driven sheaves is but ten feet in the clear. Furthermore the old rule that the smallest sheave must not be less than 40 times the diameter of the rope, has been violated, for, in order to procure the required number of revolutions at the driven shaft, its sheaves could not be more than 34 inches in diameter. On this drive, ten 1⅛ inch ropes are running at a speed of 5,150 feet per minute. In spite of these disadvantages this rope drive has been in successful operation for many months. It is probably the shortest quarter-turn drive ever erected, and is a striking example of the flexibility and advantages of rope drives in solving difficult problems in the transmission of power.

The third session opened Thursday morning with a paper entitled:

The Carding Department.

EBEN C. WILLEY, Hope Mills, N. C.

The success of cotton manufacturing covers in a broad sense the ability to produce cloth of marketable quality and character at a cost which will assure a fair margin of profit on the market value of the goods produced. To do this at certain times may be an impossibility for the manufacturer owing to the prevailing conditions, but this does not affect the organization of a mill or the condition of its machinery; improvements should be made in regular order that would be noticeable in one way or another, from the beginning to end of year about any manufacturing plant, both in the character of the finished goods and value of the property.

The idea in writing this paper was to make suggestions that were pertinent to the preparation of the cotton thread in its various processes through the carding department, which is recognized to be the foundation upon which the successful manufacture of cotton yarns is dependent to a large extent.

In the blending of the several grades or lots of cotton which may be used, extreme care should be exercised if the first process is to be well done and the beginning properly made, and owing to the high cost of the raw material a moderate expense at this point to insure careful attention in the details of mixing often results in a marked saving by an improved condition of the work in the after processes. Suggestions in regard to mixing cotton by the redrawn sample system was referred to in a former paper.

It has been demonstrated that in cleaning cotton of its impurities a heavy feed to beater gives the best results by its centrifugal action on the cotton; the improved quality of lap which is secured on the three process lapper system is on account of the extra doublings and heavy sheet of cotton delivered to the beater on the intermediate and finisher lappers, although less beaters are used than on the old system of breakers and finisher machines.

There is no question that if the first beater opens and separates the cotton as it should, it will be easier for those following to do better and cleaner work and prepare a lap for cards in the best manner; of course the grid-bars must be set correctly and draught of fans regulated to meet the location and conditions. This requires some experimenting and an overseer who is interested and understands the value of good picking, will see to it that the above matters are attended to.

On the ordinary staple cotton it is not necessary to throw out a high per cent. of fibre in the droppings to get clean picking, as the heavier feed if beater and grid-bars are properly adjusted make this unnecessary; laps both in running weight per yard and whole weight should be even, but owing to the same being regulated by the bulk it is not possible to get all the laps of uniform weight. However, they can be gotten even enough from all style of eveners, by a proper adjustment of the levers and evener kept in good working condition on a modern machine.

Lappers should be kept in the best possible condition inside as well as outside, and the only sure way is to devote a certain amount of time each day to the purpose. Ten per cent. of the actual running time should be devoted to this work and the speed regulated accordingly or new machines furnished; if beater blades and inside of machines are not kept perfectly clean it allows an accumulation of oil and dust to form which results in the cotton collecting on the end of the beaters, thereby creating an uneven current of air which causes an irregular distribution of cotton on the cages, resulting in a lap which will be found to be heavy in the centre and with light ragged selvages; this trouble is quite common.

Regarding light versus heavy feed, some years ago it was generally supposed that a light quick running feed to beater was the best method and it was believed at that time the cotton was opened and cleaned better in this way, but later, experiments were made on a set of machines by reducing speed of rolls and feeding heavy to beater with the result that the carding showed an immediate change both in cleanliness and character with the same improvement in the succeeding operations. The same changes have accomplished like results many times.

The question has often been raised in regard to the injury of the fibre by too close setting of the

beater to feed rolls or grid bars; if the cotton detached by beater was irregular and heavy, thereby clogging space between above, there would be some foundation for this belief, but as this is not possible if the cotton is held firmly by feed rolls, it would seem worth while to demonstrate this fact by a special effort to determine the actual results.

If a lapper is producing approximately 2,500 pounds of cotton per day equipped with a two bladed beater making 1,500 revolutions per minute, and allowing 10 per cent. for stoppage, the amount of cotton delivered to cages per each stroke of beater would be about ten grains. This distributed over a width of forty inches, would pass through a small space without possible injury and allow close setting if the stock used required it on account of its low grade.

As the quality of the card sliver determines in a large measure the appearance of the product of a mill, good judgment and careful attention to details is essential to get the results which are earnestly desired by all manufacturers.

Experience and intelligence are what is demanded at this point. Expense within reason to secure this is a wise investment, and the difference might be easily saved in waste, or the better running of any single process throughout a mill.

If the cards receive the laps from the picking department prepared in the best manner and the same are properly clothed, well set up and all parts adjusted so that they will run smoothly, there will be no difficulty; but if otherwise, there will be no end to the trouble which will occur, as on the grinding and setting of the cards depends the quality rather than the quantity. It can therefore be readily understood why time and patience should be given to the adjustment of same in all their details, bearing in mind at the same time that equal care must be exercised in the setting of each and every part to secure quality of sliver, as the fibres are carded at every point at which they come in contact with the wire.

What numbers of card wire should be used for the various lengths of staple and should there be a difference? While some adopted a range of numbers to cover above cottons, is it necessary? It would seem there should not be any difference, for what the longer staples make up in length the shorter would make up in increased numbers, which increases in ratio of production in a marked degree. Then why is not the finer wire more suitable in either case?

Not many years ago it was customary to clothe cards for all cottons with coarse wire or from numbers 30 to 33; a lot of cards clothed in this way were later clothed with finer wire with a great improvement in quality, at the same time an increased product was secured and the same results have been noticed wherever this change has been adopted. One thing should not be overlooked, however. If the finer wire is used it should not be set too close in the foundation, as the fibres require some clearance between the points in order that the parallelism may be secured and prevent a curling or knitting of the fibres, which will occur if points are set too close together. No doubt this is partly the reason why finer wire has not been more generally adopted, for the card clothing manufacturers set the fine wire by a standard which is too close for numbers above 34 wire, for while the points of the wire act on the fibres by separating and throwing off the impurities by the centrifugal action of the cylinder against the top flat wire, the straightening of fibres is secured between the same. By the close examination of a card it will be noticed that the cylinder points show clear and distinct above the fibres; the top flats a tangled mass of irregular lengths of fibres and foreign matter covering the points, and doffer an intermingling of carded fibres inclined toward parallelism. Nitty carding may be caused from imperfect setting, or an overloaded card cylinder, while nits are sometimes found in the raw cotton which is the result of faulty ginning; it can also be caused by the beaters if damp cotton is used, and cotton should not be used direct from the bale for this reason even if there was no other.

The draft of the card, whether short or long, does not affect its product unless desired, but there is no doubt that on short staple cotton a heavy lap and long draft, if cotton is held firmly at feed rolls, enables the cards to produce a better sliver; it is not possible to break or injure the fibre at feed by the extra weight of lap, but gives the card teeth a longer time to teazle the fibres before delivery to cylinder, for the amount of cotton received by the cylinder is the same in either case and certainly cannot be injured at this point. The benefit therefore accrues from the larger body of cotton presented to the action of the card points, enabling a better separation by a slower delivery with a more uniform sliver delivered with less variation in weight, as the heavier lap is always more even in thickness owing to the cages of lappers being more evenly covered, which cannot be secured when lightly covered or lapper is producing a light weight lap.

What is the possible product of a 40-inch revolving top flat card? Of course the staple, and if of the short variety the nature of same governs the matter to some extent; but when cards are perfectly adjusted it has seemed that it was an injury to the cotton to produce a moderate amount at a moderate speed, as it is just as easy to over card as it is the reverse. Of course this is with the understanding that the picking is not being done on the cards. If there was not quite so much fear of over picking and carding, better results would sometimes be obtained. The practical method to get what is required in quality of carding is by a quickly running doffer and light sliver, which is also an advantage to the following process by allowing shorter drafts to be adopted.

Changes in draft on the single carding system have also been followed by increased strength of yarn, which could only be accounted for in a better separation of the fibres at feed rolls and the throwing off by cylinder of a greater per cent. of short fibres, cleaner and evener carding with a more thorough mixing of the fibres by the slower delivery, owing to the longer draft and larger bulk of cotton held at feed.

The drawing frame by its simplicity and well known features is an easily operated machine, and if certain rules are carefully followed good work will result. It is very important that this branch of the carding department receive the closest attention from one who realizes the necessity of a check to any irregularity in operation, as imperfect work is easily and quickly made on this process which does not retard its operation, but does to a serious

extent the succeeding machines. A moderate speed of front roll should be insisted on in order to secure a well drawn sliver and the proper parallelism of the fibres.

The most important matter in connection with the slubbing frame process is to obtain an evenly drawn sliver to be twisted into roving, and the tension. There is no machine in a carding room which is so quickly affected by the atmospheric changes owing to the nature of the roving, which is necessarily soft twisted and cannot be wound so compactly on the bobbin, as in the other processes of roving frames, and which requires the tension to be carefully regulated. Excessive twist should be avoided as a serious danger by preventing uniform and even work from the following machines.

To the evenness in drawing the sliver at this point, depends the elimination of many uneven or weak places in the yarn, as a light spot in the roving is sure to receive extra twist, causing an irregular draft in the next process which no amount of doubling can wholly overcome.

Is the present arrangement of rolls and weighting on the fly frame pattern slubber equal to the inclined system and lever weighting used on the speeder or single flyer frame? From personal observation, it has always seemed that roving from the frames equipped with the latter style rolls produced a much evener and regular drawn sliver, but this was off-set to some extent by the construction of frames below the rolls, as there is not the least doubt of the superiority of the regular fly frame arrangement, with bobbin leading the flyer. The weighting of the rolls by the lever principle on this style of frame is its strong advantage, as it insures a more perfect weighting of top rolls by the combination of two saddles the same as on the spinning frame; by this method the weight is thrown on the front and back rolls with only a slight pressure on the middle roll. This allows for a closer adjustment of front rolls with a corresponding evenness of roving. This idea might be carried out on all process of spinning machinery that puts in twist, for, if it is applicable to a spinning frame why not to a frame whose rolls are drawing a strand many times larger in bulk and weight? Nearly all back saddles for fly frames are made so that the weight on middle is the same as that on back roll. What the advantage of the inclined arrangement of rolls would accomplish as compared to the present system it would be hard to say, but there is no question regarding the practicability of the above system of weighting.

The intermediate and fly frame process is a system of repeating to double and draw the roving to a finer strand and as the quality of same is determined by the ability of the rolls to do this, even top rolls, steel rolls running without vibration and correctly spread for the length of staple is an essential matter; the only way to secure this is by a close attention to details by those who have the oversight of these machines.

Occasionally a little judicious experimenting to determine what the value of any change in adjustment would accomplish by a test in strength of yarn is a good thing; in fact, the value of any experiment or change of whatever nature should be demonstrated in this way.

In regard to twist, too slack twist is nearly as serious a drawback as too much, although it does not occur as often. To cite an instance of the trouble caused by excessive twist will do to illustrate. Several years ago a mill spinning medium numbers using an excellent grade and staple cotton was running badly, particularly the warp spinning, the roving being very uneven; the fly frames in the carding room were running well, but on looking into the matter it was found that the roving from each process was excessively twisted, and to overcome this the rolls were spread about one-eighth of an inch more than was required for the length of staple used. An immediate change in twist and closing of rolls remedied the difficulty and was very noticeable both in improved spinning and strength of yarn. This also eliminated the troublesome weak threads which are always found in yarns of this character.

As conditions are never the same in any two mills, it is not possible to accomplish the same result by the same methods, but the ground work is the same in every case, and as the strength of yarn denotes evenness, quality, product and success, the men who hold positions of responsibility and trust about a mill should be striving at all times to secure the above conditions both as individuals and as an encouragement for others who may be employed under them. A nicely running mill usually assures a contented set of operatives which is dependent in a large measure to the quality of roving from the carding department.

This was followed by:

Humidity in Cotton Manufacturing.

GEORGE A. AYER, Easthampton, Mass.

About twenty-five years ago the value of humidity in spinning was forcibly brought to my attention in attempting to spin medium counts, 40's to 60's on frames, the spinning room being over a thread dressing room. The principal means for humidifying at that time were the watering pot and steam pot. In the mills of the day the steam pipes, usually one inch in diameter, were placed near the floor against the walls of the mill. In some cases pet cocks were screwed into the heating pipes which when opened resulted in a great deal of heat and very little moisture. There seemed to be a general feeling that heat was very desirable in cotton working, and in many mills, especially the finer ones, the heat was intense.

In the spinning room of which I have spoken, the heat of the dressing room coming through the floor, made the room very hot and excessively dry. There was no means of moistening provided except the watering can, and a too free use of this same can was liable to bring trouble from below, in the shape of the overseer of the dressing room. His claims as to the amount of water which had dripped through the floor would have been funny had it not been a serious thing for him. Still there was no other way, and the problem of maintaining an atmosphere humid enough to do good spinning, and still avoid trouble from below, led to a careful study of humidity as effecting cotton manufacture.

At this time I made many experiments and some inventions, two of which, the power hygrometer and its application to the railway head under the name of a railway head governor were patented

(see cuts). I also made plans of a mill building, the temperature and humidity of which was to be entirely independent of atmospheric conditions, and the general scheme of which was a basement to be used as a plenum chamber with power fans to furnish air, steam coils to heat, ammonia plant to cool and sprays to humidify. All to be controlled automatically, the humidifying apparatus by the power hygrometer and the temperature by rheostat, invented but not patented, about that time.

Those of you who have had experience with the railway-head-evener, will remember that the machine was governed by the tension of the cotton passing through the trumpet, and that the drawing rolls were driven faster or slower, according to the position of the trumpet. This tension was governed by a movable weight attached to the lever arm, and under the bed of the machine.

It was customary to weigh the sliver soon after starting up in the morning, then adjust the weight so as to bring the sliver to the proper weight. Repeating this operation from time to time during the day. Now at times the cotton would stand out and become fluffy and harsh, and from this cause a light sliver would exert as much pull at the trumpet's mouth as a heavier sliver at other times.

I early became aware that the cause of this difference was in the percentage of humidity in the air. When the air was dry, cotton stood out and was full of electricity. When the air was humid, the cotton laid down and slipped through the trumpet's mouth easily. It was my belief that an instrument that would overcome this difference would be of value.

And after a good deal of experiment, I perfected a device which would do the work. This consisted of two strips of soft pine wood about one inch square, cut across the grain, fastened to a metal base, and with a metal cap at the top, connected from top to bottom by a thin metal strip, which was also cemented to the wood. These strips of wood readily absorb and give out moisture thereby swelling or shrinking as the case might be, and, not being able to expand on the back, bending backward when damp, and forward when dry, from the perpendicular, according to the percentage of humidity in the air, and with considerable force, could be made to pull or push a reasonable number of pounds by increasing the number of upright sticks.

After experiment and comparison with the standard hygrodeik, I attached the machine to the railway head evener, and in place of the adjustable weight, used a sliding weight.

These were used in several mills at the time with considerable success, and the machines ran for weeks together, after being properly adjusted, without change, producing sliver the weight of which was not effected by the change of humidity from day to day.

TEMPERATURE.

Air at 60 degrees Fahrenheit is capable of carrying 5.7 grains of moisture per cubic foot at saturation. Increase the temperature to 100 degrees without increasing the moisture and the hygrometer would show 29 per cent. and it would require 19.8 grains per cubic foot for complete saturation or dew point. Air at a low temperature requires much less moisture to reach a given percentage, necessary for good spinning, than at the higher temperature.

My experience leads me to believe that temperature, within a reasonable range, has little to do with the cotton working except as it effects lubrication and personal comfort. There is in all rooms a constant circulation of air. One end or side of the room is warmer than the other, usually the south side. In this case the warm air rises to the top of the room and flows to the north side, where it comes in contact with the windows and walls, cools, and then drops to the floor and flows back to the south side. As a rule in all departments work runs better on the north than on the south side of the mill.

In my opinion ventilation or plenty of good wholesome air is a great factor in the quality and quantity of the mill's product. A man can live a month without food, possibly a week without water but a very few minutes without air, and the vital principle of air is oxygen. Oxygen then is a necessity, and other conditions being equal, a man or woman in a well ventilated room will produce a greater per cent. of good quality work than in an over-heated and ill-ventilated room.

ELECTRICITY.

Dry air and electricity go hand in hand. One is seldom present without the other. The effect of dry air and electricity on the cotton fibre is exactly the reverse of moisture. The fibres seem to repel each other and in the spinning the result is the production of a rough, hairy thread, deficient in strength and very undesirable, especially in warp. Even if the yarn be well spun, under proper conditions, and afterwards exposed to dry air charged with electricity, it will become hairy and weak. It may be safely laid down as a rule that the amount of electricity in the air is in inverse proportion to the humidity and it is essential to the quality of the work that every department be properly humidified.

A well spun warp can be sized almost to harshness, and in a room where the humidity is at 75 per cent. it will become strong and tough, showing a minimum of breakage. There will be no soft warps in the mill where the warps are properly sized and the humidity what it should be. There are, however, some exceptions to this rule. When the mill is new and the belting stiff and dry, or in the case of slipping belts, electricity may be generated in a manner difficult to do away with. But I have been successful in taking up the electricity by copper wires hung nearly in contact with the belts and attached to the sprinkler, or other piping of the mill, until such a time as the trouble can be remedied, as it usually can be by properly oiling belts.

THE IDEAL MILL.

Much has been written in regards to favored localities for the manufacture of cotton fabrics, and some places have been especially designated on account of the condition of humidity. I believe that the mill of the future will be built so that the conditions as regards temperature and humidity, will be entirely independent of outside influence and this strictly from an economic standpoint. The nearest I have ever been able to approach these conditions was in a print cloth mill of 50,000 spindles. This mill was originally equipped with

an aerophor system supplemented by steam pipes into which pet cocks had been screwed. The aerophor system had gone to decay. The bare steam pipes produced more heat than moisture and the natural result was low production and high costs. There was a basement the full size of the mill building in which water stood a great portion of the time, and the excessive dampness had attacked the timbers and floor in a threatening manner. In all other respects the mill was first class and up to date.

The problem presented was to save the floor and floor timbers and furnish humidity sufficient for successful manufacturing. There were few windows in the basement and these were made tight. A fan was installed and the basement was used as a plenum chamber. This fan was at one end of the mill and directly in front of the fan opening, a trench, which always contained water, was dug, extending the full length of the mill. Galvanized iron pipes were erected from the basement to the various rooms. These pipes were placed directly beside the posts and were nearly all 10 inches in diameter.

There were 7 pipes for the carding-room; 28 for the spinning room and 82 for the weave room. In addition to the moisture which could be gathered by the air in the basement, and for use in extremely dry weather, there was installed a series of steam pipes running lengthwise the basement and beside the piers. Under each of the upright pipes was extended a branch from the main. This branch was of brass to prevent corroding and directly under the opening of the pipe were cut three slots crosswise in the pipe and pointing upwards into the air pipe. These slots were very narrow and cut with a common hack saw ground to the thickness of 1/100 of an inch.

A valve at the end of the mill led up into each of the rooms so that the overseer could at any moment open or close them, thereby increasing or decreasing the amount of wet steam that he cared to admit into the moistening pipes. All the steam pipes were carefully covered, and the effect of the jets of steam into the air tubes, with the air under pressure and running upwards, was to so thoroughly assimilate the moisture that the odor of steam could not be detected at the top of the pipe; and the feeling to the hand was as of cold damp air rushing out with the appearance of a fog and immediately disappearing.

There were placed in each room six hygrometers and six thermometers, these being arranged on the outside rows of posts, two near each end of the room and two near the centre. Orders were given to keep the card room at a humidity as nearly as practicable 50 per cent., the spinning at 60 per cent., and the weaving 70 to 75 per cent. To be sure that this was properly done, reports to the superintendent were arranged to be taken at 7 a. m. and 1.30 p. m. In dry weather it was found well to open the moistening valves at six in the morning that the rooms might be at the proper humidity at 6.30 for starting. The general results of this system were very satisfactory and it has been continued to the present date with little or no change.

The decay of the basement timbers was checked at once.

The rooms above were supplied with plenty of fresh, clean, cool air at just the degree of humidity desired most of the time, and even in dog day weather the forcing of air through the basement seemed to have a very beneficial result. In cool weather the rooms were kept at a temperature of from 65 to 70 degrees. The spinning was on frames and ran well. Previous to the installing of this system it has been the practice to moisten the filling with water. This injured the bobbins, causing them to swell and give trouble on the spindles. To remedy this trouble, and in addition to the general moistening system, there was a room boarded off in the basement at such a level that water was constantly just under the floor.

Moisture was introduced into this room in the same manner as in the other rooms, the humidity was kept at from 90 to 95 per cent. The room opened into the elevator well in such a manner that the filling could be brought directly from the spinning room in slatted trucks and kept in store from twenty-four to forty-eight hours; after which time the twist was found to be well set and the filling to weave without kinking, the bobbins fitting perfectly and lasting well. The production and cost of this mill for one year is appended in tabular form, trusting that it will compare favorably with other print mills. It certainly eclipsed all previous records of this mill.

I will say that the production of the weave room was figured on the basis of a loom speed of 200 picks per minute and cloth in the bale ready for shipment. The cotton used was strict good ordinary and strict low middling.

In conclusion I wish to say that it is my experience that no important factor in manufacturing is so little understood as the proper control of humidity. While much has been written on the subject, and the manufacturers of humidifying apparatus urge the necessity of its use, systems installed at large expense are frequently found in poor working condition. Instruments for determining the percentage of moisture are allowed to run dry, and become clogged with lint and dirt, with the result that they cannot show the true condition of the air. I have found that the only way I could get proper results was by daily personal observation, and by reports from the various men in charge.

My whole experience leads me to believe that the highest success in cotton manufacturing demands proper atmospheric conditions, and especially a perfect control of humidity.

Logan Owen, Macon, Ga., then read a paper on Roving Traverse Motion.

An interesting paper on yarn assorting balances was then presented from George W. Thomas, of Manchester, Eng., in which he described the convenient and valuable use which may be made of the Staub balance for ascertaining the count of any kind of yarn, or the weight per yard of fabrics, from a small piece. The apparatus is contained in a convenient pocket case. The Birch Brothers Co. of Somerville, Mass., are the American agents.

At the fourth session on Thursday after-

noon the following officers were unanimously elected:

President, Herbert E. Walmsley, New Bedford, Mass.; vice-presidents, William D. Hartshorne, Lawrence, Mass.; James R. MacColl, Pawtucket, R. I.; directors to serve three years, George A. Ayers, Easthampton, Mass.; Christopher P. Brooks, New Bedford, Mass.

A ballot for new members was then taken with the following result:

Active Members: William P. Adams, Supt. Pittsfield Mills, Pittsfield, N. H.; James M. Ahmuty, Supt. Atlantic Cotton Mills, Lawrence, Mass.; J. E. Barbour, Pres. Barbour Flax Spng. Co., Paterson, N. J.; Jas. T. Broadbent, Instr. Carding and Spinning, Bradford Durfee Textile School, Fall River, Mass.; E. R. Bullock, Mech. Eng., J. & P. Coates, Pawtucket, R. I.; Horace P. Carter, Agt. Edwards Mfg. Co., Augusta, Me.; Alfred M. Chadwick, Asst. Agt., Tremont & Suffolk Mills, Lowell, Mass.; George Crompton, Treas. Wachusett Mills and member firm Crompton-Thayer Loom Co., Worcester, Mass.; Eugene Finocchiaro, Asst. Supt. Cohannet Mills, Taunton, Mass.; Hachiro Fukuhara, Kanegafuchi Spin. Co., Hiogo, Japan; Edwin Farnham Greene, Asst. Treas. Dwight Mfg. Co. and Pres. Lockwood, Greene & Co., Boston, Mass.; Chester D. Hatch, Supt. Exeter Mfg. Co., Exeter, N. H.; Arthur N. Hersom, Asst. Supt. Tremont & Suffolk Mills, Lowell, Mass.; H. B. Hopson, Supt. Spool Cot. Dept., Bibb Mfg. Co., Macon, Ga.; John T. Lord, Supt. Pacific Mill, Lawrence, Mass.; Andrew W. McAllister, Supt. Natick Mills, Natick, R. I.; William B. Orr, Supt. Renfrew Mfg. Co., Adams, Mass.; Logan Owen, Supt. Bibb Mfg. Co., Macon, Ga.; Hadley D. Perkins, member of firm Sharp, Perkins & Co., Woonsocket, R. I.; Harry J. Ricketson, Supt. Merchants' Mfg. Co., Fall River, Mass.; Henry Rowe, Mgr. Aurora Bleachery & Dye Works, Aurora, Ill.; J. N. Sanderson, Agt. Renfrew Mfg. Co., Adams, Mass.; Rufus A. Soule, Pres. Soule Mill and City Mfg. Cor., New Bedford, Mass.; Henry Wm. Stone, Supt. Holliston Mills, Norwood, Mass.; R. W. Wight, Asst. Treas. Indian Orchard Co., Indian Orchard, Mass.

Associate Members: Arthur Cecil Butler, Agt. for E. A. Leigh, 232 Summer St., Boston, Mass.; Randolph Crompton, member firm of Crompton-Thayer Loom Co., Worcester, Mass.; Daniel J. Danker, member firm of Danker & Marston, Importers of dyestuffs and chemicals, 247 Atlantic Ave., Boston, Mass.; W. F. Fowler, Mgr. Baltimore office Westinghouse Elec. & Mfg. Co., 1504 Continental Trust Bldg., Baltimore, Md.; Charles L. Ireson, Belt Mfr., Boston, Mass.; John H. Lawrence, Top Roll Mfr., New Bedford, Mass.; Frank A. LeValley, Cotton Broker, Fall River, Mass.; D. Edgar Manson, Agt. Westinghouse Elec. & Mfg. Co., Boston, Mass.; John T. Marston, member of firm Danker & Marston, 247 Atlantic Ave., Boston, Mass.; Thos. J. O'Keeffe, Mgr. Charles L. Ireson, 148 High St., Boston, Mass.; Charles F. Pray, Cloth Broker, 72 Leonard St., New York, N. Y.; Frank W. Reynolds, member firm Lockwood, Greene & Co., Boston, Mass.; William B. Scofield, member firm of Crompton-Thayer Loom Co., Worcester, Mass.; Robert Taylor, Jr., Mgr. Asa Lees & Co., Ltd., Oldham, England; John Oldfield, M. E., Beacon St., Everett, Mass.; Louis T. Shurtleff, Mgr. Pairpont Corporation, Paper Dept., New Bedford, Mass.

A very instructive paper entitled, The Approximate Cost of Mill Buildings, was then read by Charles T. Main, Boston, Mass. Without the charts and diagrams with which it was accompanied, enabling the cost of a mill building to be readily approximated, the paper can hardly be appreciated. It is a most valuable reference paper and forms an important contribution to the literature of the Association.

The next paper was entitled:

The Electric Transmission of Power.

E. W. THOMAS, Columbia, S. C.

It is now barely ten years since the electric drive was first accepted to be the sole drive of an individual cotton mill.

This plant was placed in the Columbia Mills, at Columbia, S. C., and was the result principally of the foresight of the then manager of the plant, Mr. Charles K. Oliver, who with the courage of his conviction equipped the complete mill with this form of transmission, and the idea of dividing the machinery into sections, each of which had its individual motor, was first introduced by him. Soon after this equipment was in operation, the Pelzer Manufacturing Company, of Pelzer, S. C., adopted this principle, but in their case a portion of their motive power was steam.

About this time also the Ponemah Mills, of Taftville, Conn., substituted the electric drive in a large weave shed, for their steam direct drive. Full details of the installation of these plants may be found in papers presented to this Association at the April meeting in 1895 and published in volume number 58 of the Transactions, page 216. These papers give very fully the details of the installation and so very thoroughly, that it is needless to repeat the deductions arrived at in this paper.

Nine years have passed since their presentation, and the conclusions arrived at then, from the experience up to that date, in the mills quoted, are still in force today.

The Columbia Mills plant, quoted by Mr. Paine, in his paper, which has been in operation for about ten years, and running more or less over time, is a striking example of the freedom from trouble by use of the electric drive.

It was visited by the writer within a few days, and the management made the statement, that during all the years of its operation, no trouble had arisen to change their opinion of the drive, and they fully endorsed the letter of the treasurer of the mill, which was published in Mr. Paine's paper, and which appears in the Transactions of the Association.

The result of these two mills has been such, that

today one Electric Company alone has furnished to the single state of South Carolina, distributed among about thirty textile plants, generators of a capacity of nearly 40,000 horse power and motors aggregating about 30,000 horse power and to this should be added the sales made by other manufacturers of electric equipment.

The cotton mills of New Hampshire, Massachusetts and Georgia have each many plants that have successfully installed electric driving. There can be no question but that electric driving has come to stay.

In the city of Columbia, S. C., are six cotton mills, five of which are electric driven. Four are driven from a central water power plant and one, the larger mill of the number, has its own steam generating plant and electric equipment, and from this plant is driven the last of the six mills.

From personal observation and supervision, I can say that, day in and day out but little if any trouble occurs in these plants from the use of the electric drive.

One of these mills, the Olympia, designed and erected by Mr. W. B. S. Whaley, is 553 feet in length, by 151 feet in width and four stories in height and contains complete eequipment for 100. 320 spindles, now installed and in successful operation.

The generating plant consists of three McIntosh & Seymour engines each of a normal rating of 1,600 horse power capable of developing a maximum of 2,000 horse power direct connected to alternating current generators. The engines are of vertical cross-compound condensing type with cylinders 23 and 48 inches in diameter and a stroke of 42 inches. The cylinders are steam jacketed and a reheating receiver is placed between them. The steam pressure is 165 pounds, and the makers guaranteed that the steam consumption would not exceed 12.7 pounds per horse power per hour.

The generators are 1,300 kilowatts capacity, each with 36 poles, run at 133 revolutions per minute and deliver current at 600 volts. The entire electrical equipment was furnished by the General Electric Company.

The motor equipment for driving the mill consists of twenty-two type L, induction motors of 150 horse power each, current at 550 volts and running at 600 revolutions on no load, and 588 revolutions on full load. The motors are suspended from the ceiling of the different floors and most of them are placed in the middle of a 12 feet length of shaft, the motor shaft being coupled directly with the line shafting, except in the case of the motors driving the carding and weaving machines where a counter shaft is necessary, on account of the slow speed of these machines.

The power house is located at the centre of the rear of the building, and the distribution of the motors of the mill is as follows:

In the opening room are 5 openers and 1 thread extractor, driven by a 20 horse power belted motor.

In the picker room are 5 breakers, 10 intermediate, and 10 finisher pickers driven by a 150 horse power motor.

In the card room, over the cards are two motors, 150 horse power each, one driving 88 cards, and the other driving 62 cards, both being belted motors.

There is one motor of 150 horse power driving the stubbers, intermediate roving frames and all the drawing frames.

2	motors	with	10,032	filling	spindles each
2	"	"	10,560	"	" "
2	"	"	9,504	warp	" "
2	"	"	10,032	"	" and
1	"	"	4,752	filling	" "
			5,280	warp	" "
			4,224	filling	" "
			8,808	warp	" "

The fine roving frames, 96 in all, containing 13,984 spindles, are driven by two belt driving motors of 150 horse power each.

In the driving of the 100,320 spinning spindles, are 10 motors of 150 horse power each, having the following number of spindles on each motor.

Making a total of 100,320 spindles. The spindles are number 2 Draper, and the warp rings are 1 3/4 inch diameter and the filling rings are 1 3/8.

These 10 motors, driving the spinning, are direct connected to the shafting, so that to drive this entire 100,320 spindles, there are only two lines of shafting, no counter shafts or belts; the only belting required, being that from the shaft to the tight and loose pulleys on the frames, the latter belt being but 2 3/4 inches in width. The shafting runs at the speed of 600 revolutions per minute, and the driving pulleys 33 1/2 inches diameter for warp frames and 31 inches diameter for filling frames, the pulleys having wood rims. Probably this spinning room stands unequaled in the small amount in weight of its pulleys and shafting, and the small amount of belting required for the number of spindles operated.

The spoolers and warpers are driven from the weave room lines, the amount of power required to run these machines being so small as not to require their being driven by an individual motor.

The six slashers in the mill are being driven by a belted motor of 20 horse power which also operates the large Sturtevant fan for expelling the vapor arising from size boxes and the surface of the cylinders.

The looms are situated on two floors, and the shafting is located in the lower weave room. The driving of the 2,250 looms is as follows:

1	motor	150	horsepower	464 — 40"	looms
1	"	"	"	486 — "	"
1	"	"	"	391 — "	"
1	"	"	"	585 — "	"
1	"	75	"	324 — "	"

Cloth room with four sets of cloth room machinery and baling press is driven by a 50 horse power motor.

Besides the foregoing motors, there is one located in the machine shop and four more directly connected to the feed pumps, supplying water for the boilers, tanks and toilet rooms, and for cooling the transformers.

Tests of the power required by the foregoing motors operating the textile machinery show, that of the total power required:

The picking consumes	4.42	per cent.
Carding department consumes	14.18	per cent.
Spinning consumes	59.19	per cent.
Spooling, warping, slashing and cloth room consume	3.	per cent.

Weaving consumes ..... 19.21 per cent.

100.00 per cent.

The above mill has been in constant operation for three years.

At another mill located in Columbia, and adjacent to the one just described, which was also designed and built by Mr. Whaley, there are 57,000 spindles and necessary equipment of looms for same.

This mill is driven electrically from power obtained from a water power company not owned by the mill, the power being purchased at certain price per horse power per year, the cost being based upon the meter readings at the mill.

The power plant is located about one mile from the mill and the same power company also furnishes power to three other mill plants as well as several other local industries.

The division of the machinery in this mill, in sections for each motor drive is as follows:

The opener and breaker pickers are driven from an extended card room shaft, and the motor which is of 150 horse power capacity, drives also 103 cards and all the drawing frames.

Six intermediate and six finisher pickers are driven by a 75 horse power motor.

All of the roving machinery and 12 spinning frames, are driven by a 150 horse power belted motor. The balance of the spinning frames are driven by six 150 horse power motors.

The spoolers, warpers and slashers, are driven by a 50 horse power motor.

The weaving room by three motors;

1 of 150 horse power driving 664 looms
1 of 150 horse power driving 574 looms
1 of 150 horse power driving 304 looms

The cloth room containing three sets of cloth room machinery is driven by a 20 horse power motor, and 1 motor of 20 horse power is located in the machine shop.

Tests made at this mill show that of the total power required the

Picking and carding requires ..... 19.45 per cent.
Spinning requires ..... 57.80 per cent.
Spooling, warping and slashing requires ..... 2.22 per cent.
Weaving in cloth room requires ..... 20.53 per cent.

100.00 per cent.

I have given these details of the above plants to enforce the idea of the benefits to be derived from a subdivision of the power into units as large or small as may be desired, and to fit the power required for any department. These two plants have been under my personal supervision for about one year. One, the Olympia, has been in operation for three years, and the other for about eight years, and during my term of service no mishap of any nature, due to the equipment has occurred and I am told that at no time during the entire time the plants have been in operation has any trouble been experienced from the motors and our experience here is undoubtedly that of others operating electric driven plants.

Having had ample opportunity to carefully observe this form of drive for some time, my conclusions are decidedly in its favor.

It occurs frequently in these mills, as it does in most mills, that certain parts of the mill are "out of balance" with other parts, and it may be readily seen that any section, or department, may be run independently from the others.

When certain departments of the mill, say the opener room, picker room, or cloth room, have "caught up" with the work, the throwing out of a switch at the motor by the overseer stops the machinery in that particular department, without in the slightest affecting any other department.

In the construction of the building no belt towers are required. No large, heavy belts, no large head shafts, and the counter belting is materially reduced. The widest belt in either of the above mills is but six inches. Owing to short lengths of shafting driven by each motor, one diameter may be used throughout the mill, which as all mill men know is of great advantage if changes are required in shaft pulleys.

Each motor has its cut out switch near at hand as well as a duplicate one on switch board in engine room or wheel room.

This is an advantage in as much as in case of fire, or accident, the shafting connected with any motor may be immediately brought to a standstill, without the necessity of notifying the engineer or the electrician in charge.

There is one other very important advantage one has in having the electric drive and that is the fact that the actual power required by the machinery on any motor may be known at any time, as an automatic recording instrument may be applied to the wiring at the motor itself or at the switch board in which a continuous record in ink or pencil is transcribed, either upon a circular dial or upon continuous strips of paper.

By these records the variation in the power may be seen at a glance and the study of these variations and their connection with the different degrees of temperature, the amount of humidity is most interesting. Oils may be tested on shafting and machinery, and the results of the different makes compared.

The tell-tale dial, or strip, show to the manager another very important feature, and that is whether or not from start to finish of the working forenoon, or afternoon, the machinery on the motor was all in operation the whole of the time.

Records have been obtained where it was shown that when the starting time of the mill was 6.30 in the morning, the full amount of machinery was not running until 7 o'clock and the same record shows a dropping off in power from 11.30 to 12, showing that the employees were neglecting the work, preparing to leave for the noon hour.

The engineer or electrician may have on his switch board in the power house Watt meters for each motor, and can at any moment see at a glance whether any motor is running in excess of the normal power required.

It must be allowed that this is much more satisfactory than the present "guess work" of trying to obtain the power required for any one room or department, or class of machines from indicator cards from the engine, where, when it is desired to obtain the power required for any one room or class of machines, in most mills it is necessary to

run all the shafting in the mill unless there are cut-off couplings provided.

It is also evident that in case of any accident but a minimum portion of the machinery is stopped.

The slashers in the mill are operated through the noon hour so as to avoid stopping any slasher during the running of a set of warp beams.

An interesting point, I think, that is of important advantage is the uniformity of speed obtained by the machinery in the mill.

It has been proven beyond doubt, in case of spinning and weaving, a larger production per spindle and per loom can be obtained by the electric drives over the customary methods of driving.

Many mills have been equipped with this form of driving, and not only have installments been made in newly built mills, but a large number of mills, whose motive power was generated by steam or water, have changed their system and now use electric drives to their great advantage. To the party building a new mill, and contemplating adding to its capacity later by extending the mill out at either end; the problem has no terrors, he simply extends his mill, places in his motors and extends his wires from the original generating plant and his work is done.

If he incorporates direct belt driving in his new mill at the start, he must necessarily be forced to install shafting of a larger size than is necessary for the first section of the mill, in order to have it of sufficient strength to carry his contemplated extension.

To the manager and the manufacturer who is so unfortunate as to have a group of mills bunched together in an unmethodical system, and so built that from no one unit of power can the requisite distribution be obtained, except by a large amount of shafting and belting, then the ability to wire from the central electrical power plant to his various buildings relieves him from a burden at once.

To the manufacturer having a water power, the advantage of locating his mill elsewhere than immediately adjacent to such power may be of material advantage. It is not a question today of locating the mill buildings at the water side, but contrariwise, distance from power plant to mill is becoming less a factor as the years go by.

Thus in many ways does electric driving open up advantages for a closer study of the power question, and indirectly to provide some means of determining some of the reasons why the percentage of possible productions of the machinery is so low in some of our mills.

It had been my intention in the preparation of this paper, to have presented some tests and data obtained from a careful study of the electric drive as described in the foregoing mills, but as the tests and experiments have not been finished, I have deemed it advisable to present them at some future meeting of the Association if desired.

No single item presents itself to the user of power, especially in the textile industry, that is being so fully investigated as that of electric driving.

All through the South may be seen mill after mill equipped with electrical power, some of the mills generating the current by steam engines and others by water power. Large water power developments have adopted the electric current as a means of distribution of power to textile plants, among the latter are the Columbia Power Co., the Catawba Power Co., Columbus Power Co., all of which have large power development and distribution.

There has of late come into the field an improved method of power generation, namely the steam turbine, particularly adopted to operate electric generators, its motion being rotary instead of reciprocal, as is the case with the present steam engine.

The steam turbine will give, or should give, a very uniform speed for the generators as is the case when generators are operated by a water power plant. That the steam turbine has come to stay may be evident from the fact that in the textile lines several mills have already placed orders for turbines in connection with electric driving, and many others are contemplating doing so. The application and use of the electric current as a means of transmission has before it an unlimited field. Hundreds of thousands of horse power of water remain as yet undeveloped throughout the South and West, that some day will be developed and the power thus obtained will be used by the steam railroad as their motive power as well as for distribution for mechanical purposes.

In response to the president's suggestion for the further discussion of this paper, Mr. Paine, of the General Electric Company, called particular attention to the value of the tell-tale recording device, which is now used to register the amount of power used by the individual motors or in any particular room. These records have brought out some very interesting facts in connection with the running of the machinery in the different departments, and have enabled the superintendent to detect quickly where the power consumption shows a falling off, thus indicating a stoppage of machinery. Mr. Paine explained the advantage of being able to localize the power consumption over a general record for the whole mill by stating that when these individual local records were put together it was shown that the general result was an extremely uniform consumption of power, and if dependence were placed upon the total power consumption record it would be impossible to appreciate the variation that was going on in the individual departments, which usually offset each other in the totals.

A paper by B. H. Thwaite, London, Eng., on Gas Power Applied to the Textile Industry, was then read.

Mr. Edward Atkinson did not wholly agree with some of the statements in Mr. Thwaite's paper, and quoted from the reports of The Mutual Boiler Insurance Company, showing that some textile establishments were doing better with steam than Mr. Thwaite claimed. From tabulated reports from one hundred establishments, the best

showing was the consumption of about 1 1/10th pounds of coal per H. P. per hour. From that the consumption ran up to as high as 5 pounds per H. P. per hour in some Western plants, where the cost of coal is very cheap.

He then presented some interesting facts concerning the heat values of different kinds of coal, which showed a variation from 20 to 25 per cent. between the better and poorer grades. This led to the interesting and very valuable investigations which are being conducted under the direction of Prof. Norton of the Massachusetts Institute of Technology relative to the fuel value of mud obtained from bogs in New England and elsewhere. It was doubtless a surprise to many of the members to learn what great progress has been made towards what may indeed be revolutionary conditions in the power-using industries. Mr. Atkinson stated that if further investigations bore out the results already obtained, the world might be on the eve of one of its greatest discoveries, and even at the present time he was obliged to try hard "to make believe that he did not believe" what the facts seemed to show. If the conclusions now probable are realized, any New England or Northern locality where present fuel costs more than $2 per ton, can with advantage employ mud fuel, either for conversion into coke or for generation of gas for power purposes. The members showed the keenest interest in Mr. Atkinson's statements, and he was heartily applauded.

There being no further discussion, President Walmsley brought the meeting to a close with a few well-chosen words, in which he thanked the members for the honor conferred upon him by his re-election to the office of president, and assured them of his best efforts to advance the interests of the Association. He then declared the seventy-sixth annual meeting of the New England Cotton Manufacturers' Association adjourned.

Following is a list of the members and guests present:

Members: Henry S. Pritchett, Boston, Mass.; Alfred E. Adams, Whitinsville, Mass.; John S. Adams, Jr., Adams, Mass.; Joseph D. Aikin, Taftville, Conn.; Thomas Armstrong, North Pownal, Vt.; Edward Atkinson, Boston, Mass.; George A. Ayer, Easthampton, Mass.; Nathaniel F. Ayer, Lisbon, Me.; J. W. Bailey, Fall River, Mass.; Edward R. Ballou, Providence, R. I.; Frederick D. Ballou, Jewett City, Conn.; J. E. Barbour, Paterson, N. J.; Lewis E. Barnes, Methuen, Mass.; Robert Beatty, Philadelphia, Pa.; A. C. Bent, Taunton, Mass.; John B. Bodge, Fall River, Mass.; A. E. Bosworth, Georgiaville, R. I.; Arthur F. Bracket, Riverpoint, R. I.; Albert W. Brainerd, Lawrence, Mass.; Christopher P. Brooks, New Bedford, Mass.; Henry R. Brown, Phenix, R. I.; Robert Burgess, Pawtucket, R. I.; Hervey Burnham, North Adams, Mass.; John L. Burton, Newmarket, N. H.; Byron F. Card, Philadelphia, Pa.; Alfred M. Chadwick, Lowell, Mass.; Chas. E. Childs, Northampton, Mass.; Daniel Clark, Philadelphia, Pa.; Josiah G. Coburn, Newton, Mass.; Charles H. Collins, Ashton, R. I.; Frank B. Comins, Boston, Mass.; John J. Connell, Lowell, Mass.; William J. Cray, Moosup, Conn.; Philip Dana, Westbrook, Me.; E. W. Davenport, Passaic, N. J.; Charles W. Dennett, North Adams, Mass.; Edward P. Dennis, Lowell, Mass.; P. Y. DeNormandie, Boston, Mass.; Henry C. Dexter, Pawtucket, R. I.; George Otis Draper, Hopedale, Mass.; William F. Draper, Hopedale, Mass.; John H. Dunn, Lowell, Mass.; Frank J. Dutcher, Hopedale, Mass.; Russell W. Eaton, Brunswick, Me.; John Eccles, Taftville, Conn.; Frederick W. Ely, Greenville, N. H.; John H. Estes, Fall River, Mass.; William Firth, Boston, Mass.; Charles H. Fish, Dover, N. H.; M. F. Foster, Milford, N. H.; Arthur C. Freeman, Providence, R. I.; C. H. Frisbie, Norwich, Conn.; E. Stanley Gary, Baltimore, Md.; James Gee, Fiskville, R. I.; Charles E. Getchell, Waltham, Mass.; William C. Godfrey, Indian Orchard, Mass.; George P. Grant, Jr., Fitchburg, Mass.; D. W. Gray, Utica, N. Y.; Frederick Stuart Greene, New York City; John Gregson, Fiskdale, Mass.; David Grove, Central Falls, R. I.; Arthur H. Gulliver, Waltham, Mass.; Walter B. Hall, Pontiac, R. I.; Z. D. Hall, Adams, Mass.; John F. Hamlet, Fall River, Mass.; William D. Hartshorne, Lawrence, Mass.; Walter M. Hastings, Lawrence, Mass.; William Hayes, Auburn, Me.; Arthur H. Hersom, Lowell, Mass.; T. I. Hickman, Augusta, Ga.; Charles H. Hobbs, Thorndike, Mass.; Franklin W. Hobbs, Boston, Mass.; Charles M. Holmes, Natick, R. I.; George W. Holt, Putnam, Conn.; William P. Holt, Fall River, Mass.; Henry S. Houghton, Jr., Northbridge, Mass.; Otis L. Humphrey, Lowell, Mass.; D. Edwin Irving, Chester, Pa.; Joseph B. Jamieson Boston, Mass.; Leonard Johnson, Fall River, Mass.; David S. Jonston, Cohoes, N. Y.; W. E. Keach, Fitchburg, Mass.; Roland R. Kelly, Williamstown Sta., Mass.; Jesse A. Knight, Taunton, Mass.; Stephen A. Knight, Providence, R. I.; Fred Lacey, Valleyfield, P. Q.; Harold Lawton, Baltic, Conn.; Evan Arthur Leigh, Boston, Mass.; Charles F. Libby, Lowell, Mass.; William H. Loftus, Newark, N. J.; Arthur H. Lowe, Fitchburg, Mass.; William L. Lyall, Passaic, N. J.; Herbert Lyman, Boston, Mass.; Ronald T. Lyman, Boston, Mass.; James R. MacColl, Pawtucket, R. I.; Frederick B. Macy, New Bedford, Mass.; Alexander Makepiece, Fall River, Mass.; Charles R. Makepeace, Providence, R. I.; D. Edgar Manson, Boston, Mass.; Henry F. Mansfield, Utica, N. Y.; Thomas Mayor, Providence, R. I.; Robert McArthur, Biddeford, Me.; William G. McLoon, Clinton, Mass.; John Tempest Meats, Taunton, Mass.; Joseph Merriam, Middletown, Conn.; Edward A. Mongeon, Lonsdale, R. I.; J. R.

Montgomery, Windsor Locks, Conn.; George B. Morison, Boston, Mass.; Albert H. Morton, Lowell, Mass.; John Neild, New Bedford, Mass.; Albert W. Noone, Peterboro, N. H.; Henry Osgood, Salem, Mass.; Herbert W. Owen, Dover, N. H.; O. B. Parker, Quidnick, R. I.; Walter E. Parker, Lawrence, Mass.; William C. Pierce, Providence, R. I.; William D. Pennell, Lewiston, Me.; Haven C. Perham, Lowell, Mass.; J. F. Powers, Middletown, Conn.; Lavater W. Powers, New Bedford, Mass.; George E. Prest, Worcester, Mass.; John E. Prest, Worcester, Mass.; M. W. Quinn, Amesbury, Mass.; Charles H. Richardson, Clinton, Mass.; Alfred Sagar, Methuen, Mass.; Arnold B. Sanford, Boston, Mass.; Pardon B. Sanford, Utica, N. Y.; Albion K. Searls, Utica, N. Y.; Willis S. Shepard, Ponkapoag, Mass.; Herbert H. Shumway, Taunton, Mass.; J. C. Smith, Fall River, Mass.; Thomas Henry Smith, Jamestown, N. Y.; George E. Spofford, Blackstone, Mass.; T. B. Stevenson, Manchaug, Mass.; Robert Stewart, Ashton, R. I.; William J. Stewart, Webster, Mass.; Walter F. Stiles, Fitchburg, Mass.; John Sullivan, Fall River, Mass.; Walter H. Summersby, Lawrence, Mass.; James W. Taylor, Taunton, Mass.; Charles E. Thomas, Woonsocket, R. I.; James O. Thompson, Jr., New Bedford, Mass.; James P. Tolman, Boston, Mass.; M. J. Toohey, Fall River, Mass.; George W. Towne, Columbus, Ga.; C. H. Truesdell, Killingly, Conn.; Oscar B. Truesdell, Newtonville, Mass.; Herbert E. Walmsley, New Bedford, Mass.; Joseph Watters, Fall River, Mass.; A. Tenny White, Manville, R. I.; Alphonso F. White, Forestdale, R. I.; John B. Wild, Utica, N. Y.; Henry Williams, Taunton, Mass.; Elias S. Willis, Lowell, Mass.; C. J. H. Woodbury, Lynn, Mass.; Wm. I. Woodward, Norwich, Conn.; Eugene C. Andres, Boston, Mass.; Albert Birch, Somerville, Mass.; F. H. Bishop, Boston, Mass.; Edmund E. Blake, Newton Upper Falls, Mass.; Arthur T. Bradlee, Boston, Mass.; J. Frank Braids, Providence, R. I.; Henry Gordon Brinckerhoff, Boston, Mass.; H. Martin Brown, Providence, R. I.; John H. Burghardt, Boston, Mass.; Charles B. Burleigh, Boston, Mass.; Eugene E. Burnham, Lawrence, Mass.; Harry Butterworth, Philadelphia, Pa.; W. W. Carey, Lowell, Mass.; Charles H. Child, Providence, R. I.; Melvin H. Coffin, Whitinsville, Mass.; Thomas G. Cox, Taunton, Mass.; C. F. Curwen, Salem, Mass.; Joseph L. Cushing, Lowell, Mass.; Daniel J. Danker, Boston, Mass.; Hugh De Haven, Brooklyn, N. Y.; John O. DeWolf, Boston, Mass.; C. E. W. Dow, Boston, Mass.; Fred W. Easton, Pawtucket, R. I.; William Dresser Edwards, Jamaica Plain, Mass.; G. B Emmons, Lawrence, Mass.; John T. Fyans, Fall River, Mass.; H. P. Garland, Saco, Me.; Royal W. Gates, Lowell, Mass.; Vladimir F. Gnesin, New York City; Rufus B. Goff, Providence, R. I.; Alfred H. Hartley, Fall River, Mass.; Henry S. Houghton, Sr., Woonsocket, R. I.; Frederic W. Howe, Providence, R. I.; David Jackson, Pawtucket, R. I.; John E. Kendrick, Providence, R. I.; Frank B. Kenny, Lowell, Mass.; Joseph C. King, Boston, Mass.; W. C. Langford, Providence, R. I; Stephen C. Lowe, Boston, Mass.; John T. Marston, Oldham, Mass.; Fay H. Martin, Boston, Mass.; John McCullough, New Bedford, Mass.; John R. Mitchell, New York City; Robert W. Neff, Boston, Mass.; John H. Nelson, Lynn, Mass.; William R. Noone, Boston, Mass.; J. O'Keefe, Boston, Mass.; Sidney B. Paine, Boston, Mass.; Arthur Parkinson, New York City; Theodore H. Price, New York City; John Oldfield, Everett, Mass.; Dwight Seabury, Pawtucket, R. I.; George W. Stafford, Readville, Mass.; H. E. Stafford, Readville, Mass.; James Strang, Indian Orchard, Mass.; George C. Tewksbury, Boston, Mass.; James T. Thornton, Providence, R. I.; A. Curtis Tingley, Providence, R. I.; Allison W. Trafford, Fall River, Mass.; Clement A. Wakefield, Biddeford, Me.; Justin A. Ware, Spring Hill, Mass.; Lettice R. Washburn, New Bedford, Mass.; Walter S. Watson, Lowell, Mass.; William R. West, New Bedford, Mass.; W. W. White, Worcester, Mass.; Fred A. Wilde, Pawtucket, R. I.; Erving Yale Woolley, Boston, Mass.

Guests: H. K. Barnes, F. L. Gardner, Boston, Mass.; A. A. Aspinwall, Pawtucket; L. T. Shurtleff, A. F. Sullivan, Lowell, Mass.; W. J. Stimpson, Hopedale, Mass.; H. J. Ballou, Boston, Mass.; G. W. Foster, Providence, R. I.; Samuel S. Dale, editor Textile World Record, Boston, Mass.; J. P. Marsden, Oldham, Mass.; Jno. W. Mayor, Providence, R. I.; A. C. Butler, Boston, Mass.; Wm. J. Johnson, Fall River, Mass.; W. W. Ballagh, C. H. Barclay, S. H. Steel, Boston, Mass.; R. W. Merriam, Middletown, Conn.; F. L. Chase, Providence, R. I.; G. Lewis, H. J. Dodge, Boston, Mass.; A B. Spencer, F. E. Olds, Providence, R. I.; E. A. Bullock, Pawtucket, R. I.; A. F. Ray, H. G. Kittredge, J. F. Peck, Philip C. Lowe, G. P. Coppins, W. J. Battison, L. Dana, J. R. McKee, R. B. Gregson, F. H. Burt, E. R. Brooke, W. A. Moyer, R. H. J. Goddard, Jr., James S. Carter, Walter Wood, S. H. Steele, Benj. C. Brownell, Philip R. Hovey, Boston, Mass.; E. S. Jocelyn, Providence, R. I.; R. L. Reynolds, Fall River, Mass.; Hans Meiul, Vienna; J. H. Lamb, A. E. Howes, Jno. B. McPherson, Boston, Mass.; John S. Ballard, New Bedford, Mass.; C. A. Seity, Boston, Mass.; C. D. Hatch, Exeter, N. H.; A. P. Smith, New Bedford, Mass.; E. L. Merron, E. A. Rusden, Providence. R. I.; W. D. White, H. L. Green, Worcester. Mass.; Mrs. Channing Lilly, Mrs. D. M. Bates, Wilmington, Mass.; Henry G. Lord, "Textile World Record"; H. H. Higgs, Amsterdam, N. Y.; F. L. Nagle, "Textile World Record"; Jno. Merchant, Providence, R. I.; A. M. Fairley, Tarboro, N. C.; F. F. Wooley, Pawtucket, R. I.; Henry Marsh, New Bedford, Mass.; J. A. Cooper, Whitinsville, Mass.; Jno. J. Nickerson, New Bedford, Mass.; R. L. Van Dyke, New York; Jacob Stephans, Pawtucket, R. I.; H. A. White, Lowell, Mass.; P. C. Wentworth, Fall River; R. E. Wattles, Canton, Mass.; H. Y. Yagi, Cambridge, Mass.; Richard Johnson, England; J. A. Bryant, Boston; Jno. H. Lawrence, J. W. Hinsdale, New Bedford, Mass.; E. W. Waters, Fall River, Mass.; F. P. Blake, W. J. Curit, G. F. Steele, Boston; G. S. Norton, Salem; R. R. Keller, Williamstown, Mass.; W. C. Thomas, Huntsville, Ala., care Lowe Mfg. Co.; Leslie P. Langworthy, Providence, R. I.; H. C. Vliet, Newark, N. J.; A. L. Hambly, Quidnick, R. I.; H. P. Thompson, Boston, Mass.; M. E. Gleason, Providence, R. I.; A. H. Paul, Waltham, Mass.; F. M. Griswold, New York, N. Y.; Geo. Sherman, North Pownal, Vt.; Chas. M. Mumford, Providence, R. I.; L. W. Campbell, Woonsocket, R. I.; A. M. Fraser, Fall River, Mass.; F. G. Page, Pawtucket, R. I.; Fred Culver, Taunton, Mass.; L. C. Farnsworth, Providence, R. I.; W. H. Garner, Newmarket, N. H.; Adam Grove, Newark, N. J.; R. C. Eastman, M. P. Campbell, Providence, R. I.

TEXTILE PROCESSES.

EDITED BY E. A. POSSELT.

BURRING, CARBONIZING, PICKING, MIXING AND OILING WOOL IN THE PREPARATORY DEPARTMENT.

(Continued from April.)

When the pile is finished and the stock to be taken away for feeding into the wool picker, always break into the pile vertically downward, so as to put at the same time on the feed-apron of the wool picker, or in its self feed, part of each layer composing the pile. This is continued till the whole of one side of the square has been gone through, always pulling the whole of the side equally, so that when the end is reached, the whole side presents a perpendicular and even frontage, the affair in itself being repeated until the entire mixing thus has been used up. After passing the mixed lot once through the wool picker, the procedure of forming a mixing stack is repeated, the same in turn being with extra particular mixtures, several kinds fed again to the picker in the same manner as explained before. In some cases, if dealing and colors of materials to be blended in this manner into one lot, the affair is repeated a third time. It may be well to mention here that when any cotton, silk or other fibre than wool has to be added to the mixing, it can only be safely done after the oil has been applied and absorbed by the woolen materials, for if the oil comes directly into contact with either silk, cotton, or other fibre, as the case may be, it prevents the cotton, etc., from opening freely in the carding process. Therefore satisfactory mixing in this instance only can be done by commencing the series of layers of cotton, silk, etc., after the layer of woolen material has been properly oiled and said oil absorbed by it, the same being true for every succeeding layer of woolen material placed on the pile, previous to the layers of the cotton, silk, etc.

Oiling.—Wools have to be oiled or lubricated in order to return to the fibres, as far as possible, their natural pliability which was taken from the fibres at scouring and drying. This is necessary to enable the characteristic rough surface of the fibres to slide on each other with the greatest possible ease during carding and spinning. An oil best suited for lubricating wool should possess fluidity, body and viscosity, the property of being completely saponifiable, non-evaporative, free from acids, should not be easily oxidizable, not favorable to fungus growth and free from other organic oils.

The best known brand for this purpose is olive oil, the quality of which depends upon the method of production and the time at which it is gathered. It readily softens the wool fibre and keeps it in this state for a comparatively long time.

Another and much cheaper lubricant is oleine, which is obtained from the manufacture of stearine candles, and when free from acid, is well adapted to the oiling of wool. This product is frequently brought into the market for its cheapness, with the acid only imperfectly removed, in which case it will injure the card clothing, and possibly also the hands of the person handling the oiled stock in the picker and card room.

Another lubricant used for some grades of wool is red oil, of which there are two kinds in the market, the saponified and the elaine (distilled), the latter being the most suitable for this purpose.

A frequently used lubricant for wool is lard oil, which however becomes hard at a comparatively high temperature.

It was mentioned that the oil used should be in the form of a fluid, and it may be added that it should remain so at a low temperature —say freezing point—as then it is much more easily handled and may be more readily gotten out of the cask.

An oil that has the property of sticking readily to the wool, is said to have body, or to be viscous. However if the oil possesses too much body, it will not run freely from one lock of wool to another in the oiling opera-

tion, while in case the oil has too little body, as in light mineral oils, it runs too freely from lock to lock, and consequently doesn't penetrate thoroughly into the whole stock. The reason for this is that the surface friction of the fibre and the particles of oil among themselves is too small.

Nearly all oils oxidize on exposure to air, those which absorb oxygen most rapidly becoming gummy and rancid in the course of a week's time. The amount of oxidation taking place depends upon the area of surface exposed, and in order to prevent it as much as possible, in a lot of wool which has to stand after being oiled, it should be stacked as compactly as practicable with the air as much as possible excluded. Oxidation of the oil also takes place more rapidly when it is exposed to light. An oil should not evaporate easily under ordinary conditions, because it leaves the remaining constituents, which are much more viscous than they ought to be for the proper manipulation of the wool in the succeeding processes. Olive oils do not evaporate easily, which is another good property of it, but in the case of sperm and mineral oils evaporation takes place more rapidly.

It is of great advantage in the finishing process that the oil as used on wool for lubricating, should be completely saponifiable, because all the oil in the cloth can be easily converted into soap in the scouring process by the addition of alkali, as for example caustic soda, thus the oil which first served to lubricate the wool, would then be converted into a soap and besides freeing itself from the cloth in the washing process also acts to scour the goods. Provided soap was not formed from the oil, the former would have to be added to scour the cloth. Olive oil is almost completely saponifiable, this being another and very important reason for its use, although it will not stand boiling and still retain this saponifiable property, since boiling converts the oil into a substance which cannot be converted into soap.

Mineral oil would answer all requirements for lubricating purposes on wool in the carding and spinning processes, but does not form a soap in connection with an alkali, so that it only serves half the purpose for which it is intended. Thus it will be seen that it is of economical value to use an oil which will lubricate the wool and also be converted into a soap at the scouring process.

Dry wool, which has not been oiled, spins badly, if indeed it can be spun at all and consequently as the amount of oil used is reduced, the carding process is made proportionately harder. Any reduction in the amount of oil below what is necessary to properly lubricate the wool results in increased flyings and waste in the card room, besides causing the fibres to work badly in both rooms, causing imperfect yarns, decreased production, and inferior cloth, so that any experiment in the way of reducing the quantity of the oil is frequently attended with serious consequences.

The method of oiling by hand is carried out as follows: While the material is spread out in a layer for mixing, a common sized watering can, to which is attached a T shaped spout with small perforations in the end, is filled with the oil to be used and the same is then evenly sprinkled over the entire area. Previous to putting the oil in the can, it should be filtered by running through a piece of burlap so as to remove any impurities which might possibly clog the small holes in the cross piece. Then, after sprinkling the wool, a pole eight or ten feet long is used to pound the wool, and by a twist which the operator gives the pole as it strikes the batch, turns the top of the layer which had received the oil down into the batch, which serves to more thoroughly spread the oil throughout the stock. There is quite a knack in giving this twist to the pole, and a painstaking picker man can contribute much to the success of the carding and spinning operations by paying attention to this point; but as it requires considerable effort and strong arms, it is very liable, especially in case of careless and indifferent workmen, to be slighted. After one layer has been oiled and shaken up another is applied and the same operation repeated.

Should the mixing consist of a variety of materials, then some one of the materials should be fixed upon and the oil be sprinkled upon it every time its layer comes round in the batch. For example, with wool and shoddy, in some cases it is desirable that the

oil should be spread over the pile every time a layer of wool is laid down. At another time it may be advisable to spread the oil upon the shoddy layers, especially if the shoddy has been dyed just previous to mixing.

It often happens that the wool or other material is not thoroughly dried when coming to the mixing room, which is a serious difficulty, since the dust cannot be gotten out in the picking, and if the dust be left in, then when the oil is applied and the mixing taken to the card room, a paste is formed of the dust and oil, which speedily clogs up the card clothing, and produces waste and great irregularity in the yarn produced.

When the dust has been properly gotten rid of, the wool can be damped back again to any degree that may be deemed advisable to facilitate its proper working. Condensed steam water is the best agent to employ along with the oil for conditioning the wool for working. To ten gallons of oil take five gallons of condensed steam water, into which has been poured about half a pint of ammonia, and stir the water and oil together. The ammonia added will enable the steam water to easily mix with the oil and form a very limpid oil cream, which is much thinner than the pure oil alone. If too much ammonia is used, the mixture becomes too stiff, while if too little, the water and oil do not sufficiently and evenly mix, from which it will be seen that judgment is required to have just sufficient ammonia in the water to hold the oil in solution long enough to give time for its being spread upon the wool. Caution is necessary in making the mixture, since ammonia in solution varies considerably in strength, and the quantity used must be regulated accordingly.

Where the stock under operation is of an inferior grade and it is not desired to make too much expense, it will be advisable to still adhere to a good oil, but use proportionately less of it, according to the inferiority of the work, the manner in which it is applied being in this case to thin it out with steam water as previously explained. Cheap, recovered oils which are black and dirty will invariably cause trouble, even if used in connection with very cheap grades of mixings, say shoddy and mungo and thus should be shunned. Olive oil is best used after being thinned down with steam water in the manner described, as it then spreads freely over the entire mass of a mixing, so that one portion is not saturated while other portions are left dry. For all kinds of better class work a mixture with a proportion of two parts of oil to one of water will be found to give satisfactory results. From the fact that ammonia is a volatile alkali, it will leave the material as the latter passes through the card room, and this without any ill effects to the material. It must not be understood that by using water in connection with the oil, that a sufficient oiling can be gotten with one-third less than is called for, since such is not the case, the only object gained being that one portion of the mixing does not receive more than its share of oil while the other is left without. The correct amount of oil necessary to lubricate a given quantity of wool varies with every class of the wool industry, so that no definite rule to apply to every case can be laid down. A manufacturer making a medium class of goods will probably use two gallons of oil to every 100 lbs. of wool, while another mill will use more or less, according to the idea of the carder in the mill. Each uses oil according to its own special needs, since the proper amount of oil for a blend will vary from a variety of reasons. Some operatives can use economy and others are quite reckless of the quantity used, because the cost does not come out of their pockets. Of course, a large proportion of dyed wool, being harsh and brittle, will require more oil than undyed, but, where much shoddy, mungo and extract are used, less is required, since these materials have been previously oiled during picking and garnetting. Clean scoured wool, with some proportion of cotton and shoddy, would be properly saturated with about seven quarts per one hundred pounds of material mixed, the greatest care being taken that none of this oil comes in contact with the cotton, a feature previously explained. The total amount of oil for the whole batch is generally measured out carefully at one time by the carder, but the amount applied to each layer must of necessity be left to the judgment of the operative; consequently he must be instructed that one portion of the batch receives

the same share of the oil as the others, although any slight variations made by him will to a great extent be remedied in the subsequent operation of picking. However we may frequently notice that one part of the batch has more oil than the rest, which in turn will indicate negligence on the part of the operative.

The addition of water to the proper amount of oil, besides thinning the latter out so that it spreads over the batch better, also gives back to the wool the requisite amount of moisture, which is very necessary to have present during carding and spinning, and which had practically been taken away during drying. One of the objections to water, although it is more or less indispensable, is that water evaporates rapidly, and as this evaporation does not proceed in a uniform manner throughout the batch, it causes a great deal of trouble in the card room, since such lots at the start will contain more moisture and consequently will card better than in a few days, when a part of the water has evaporated, and sometimes, especially if the batch is large, the last part of it to be carded will contain little if any moisture. This variation in moisture in a lot is a very serious matter, and causes uneven yarn and bad spinning. The evaporation of the water after the wool is picked, and while held in storage waiting to be carded, can be prevented in great measure by keeping it packed closely in tight bins.

An Automatic Stock Oiling Machine.—During late years an improved system of oiling has been placed on the market by Messrs. Geo. S. Harwood & Son, for automatically oiling the stock at the picker. The machine is simple and at the same time a most reliable device, consisting of a revolving brush, on which the oil is dropped by a vibrating pipe which leads from a tank placed over the feed end of the picker, the oiling itself being done close to the feed rolls. The brush, just referred to, strikes against a metal blade and thus converts the oil into a spray, which is thrown on the wool. Being in the form of a spray instead of in drops or in a solid stream as is the case more or less always with oiling by hand, the composition penetrates the stock thoroughly and reaches the individual fibres very effectively, and with a perfect uniformity of distribution in the amount of oil desired.

The oil or emulsion required for oiling the complete batch or lot is placed in a tank or receptacle located in a convenient place on the floor of the picker-room, and pumped to the reservoir as situated overhead, i, e., above the feed end of the picker, said reservoir being provided with an overflow to the lower situated tank previously referred to. This arrangement keeps the oil or emulsion in constant agitation, preventing any separation of the oil and water, and the liquid in the upper reservoir is maintained at a uniform level, an arrangement of the greatest of importance for perfect—uniform—oiling of the batch under operation. The flow of oil can be closely regulated, a dial being provided for this purpose which shows exactly the amount of oil consumed, while a gauge on the lower tank shows exactly how much oil remains to be applied, thus a given quantity of oil can be thrown on to a given quantity of wool or mix, as the case may be, at will. This is of great importance, since some classes of wool need more oil than others. The oil runs by gravitation directly to vertical tubes, and is converted into oil vapor, and the chamber which contains the oil and the vertical tubes has a steam pipe to keep the oil in a liquid state, and make it independent of changes of temperature, another important item, and also oil thus heated becomes thinner, and, as practice will readily prove, will efficiently oil a much larger quantity than if thrown on to the wool, as more or less done in connection with mixing by hand, at its natural temperature. Therefore, greater economy all around is gained in connection with this automatic oiler, and the great number of carders still adhering to their old style of oiling by hand would find it in their own interest to carefully study the matter and in turn save money to the mill, both in amount of oil used as well as amount and quality of roving delivered to the spinning department. Similarly as in all other departments of a mill, a machine well constructed, on good sound principles, like this automatic oiler is, has to replace hand work, in turn lighten the work of the operator, the person in charge of the department and in turn save money to the mill. By means of this new automatic oiler,

each and every fibre in the batch receives its share of oil vapor, and looks as glossy as lustre wool, thus readily proving the practical value of this mode of oiling. Another feature carders not using this device must carefully consider is the fact that oil equally and evenly applied over each and every fibre of the entire batch, will in turn facilitate carding and spinning, and this with a minimum of waste.

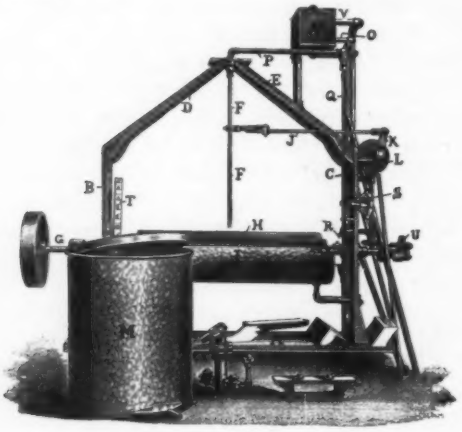


FIG. 3. AUTOMATIC OILER.

The accompanying illustration, Fig. 3, is a front view of this automatic oiler, as detached from its working position on a picker, the lower oil tank being also shown in the illustration but not connected to the oiler. In attaching the oiler to a picker, the base, A, of the former is bolted to the feed table of the picker and is near to the feed rolls as practicable. This base carries upright pieces, B and C, to which are connected the arms D and E at the top ends, said arms being placed to converge and meet each other at the centre between the pieces B and C, and thus form a support for the swing pipe, F. Fitted in bearings in the pieces B and C at a sufficient distance above the base, A, is a shaft, G, carrying the oiling brush, H, which is supplied with oil across its entire length by means of the swing pipe, F, and which oil is converted into a fine spray by having a spraying knife set to said brush so as to cause vibration of the bristles and thus throw the oil off and onto the wool in a finely divided state. The drain pan, I, is placed under the brush, as shown, having a pipe connected to return the oil back into use. The swing pipe, F, receives its vibrations back and forth across the length of the brush by means of a rod, J, connected to it at one end and having its other end pivotally secured to a revolving arm, K, as secured to the same shaft as carrying the gear, L, said gear being positively driven from the brush shaft, G, through the gearing shown.

The oil or emulsion is pumped from the tank, M, when connected up properly, by means of a pump (shown disconnected in the illustration) to the top or overhead reservoir, N, through the pipe, O, the pipe, P, in turn delivering it to the swing pipe, F. The regulating device for the flow of oil through the pipe, P, consists of a rod, Q, having its top end connected to a valve in said pipe, P, and having its lower end-screw threaded to receive a thumbnut, R, by which the flow of oil may be regulated. Secured also on this rod, Q, is one end of the dial needle of the dial, S, so that any movement of said rod, Q, will be shown on the dial and by this means the amount of oil passing through the pipe, P, ascertained. By this means the proper amount of oil required for different classes of wool, as found by experience, may be easily and accurately regulated.

A gauge, T, on the outside of the lower oil tank, M, will show at a glance the quantity of oil in the tank. The pump is connected to the shaft, G, at U, and thus works when the machine is in operation, and remains inoperative when the machine is stopped, and is driven from the Bramwell feeder, so that the oiler and the feeder are operated as a unit, in this manner saving a useless expense of power. An overflow pipe, V, is provided for the overhead tank, N, so as to prevent any possibility of an accident due to a surplus of oil being forced into the overhead reservoir.

Referring more in detail to the automatic oiler, the pump for transferring the oil or emulsion from the tank to the overhead reservoir can be adjusted to pump from one to one hundred gallons per hour, as required; a half-inch to an inch stroke being generally sufficient to supply the demand. This automatic oiler is of no inconvenience to a picker when in connection with it a Bramwell self feed is used, the only care to be taken being

to so adjust self-feeder as to take up as little room as possible on feed table. Ordinarily eighteen inches of space is required from centre of feed rolls to front of feed bonnet for the oiler. In order to keep the quantity of oil to each hundred pounds of stock uniform, keep the hopper of the self feed as uniformly full of stock as possible. Do not let it run down at any time, and keep the oil tank and screen as clean as possible from all kinds of foreign matter. It will be advisable not to raise the oiler more than absolutely necessary in order to allow sufficient room for the stock to pass clear under the drip pan at all times. Where emulsion is used, some mills have dispensed with the drip pan altogether, as it is not considered necessary, but the value of this can be decided by practical experience in each case.

In connection with using this automatic oiler be sure to have the cylinder of the picker well balanced, so as to avoid excessive vibration when running full speed, since such excessive vibration of the picker cylinder would destroy the pipe unions and cause leakage and waste of oil.

Also be careful to have the brush and knife blade as level as possible, each with the other, so that the oil will not run off to the side of the knife blade, which should be set at an angle of forty-five degrees into the brush, to throw a fine spray of oil. The speed of the brush should not be less than sixty revolutions per minute, nor more than ninety; however, this item depends a great deal upon the character of the stock under operation or character and quality of the spray desired.

A good plan to regulate the quantity of oil per hundred pounds of stock, is to place only the amount of oil in the tank required for the batch you desire to run through and set the supply valve so that when one-fourth of the batch is run through the tank gauge will show that one-fourth of the oil is gone, and when one-half of the batch is through, one-half of the oil will be used; and so on in like proportions, until you ascertain by experience just where to set the pin in the dial valve with arrow on dial, to bring the oil and stock out even at all times. The float and gauge on the tank will always correctly register the amount of oil in said tank. This oiler is in use in mills where the very lowest character of intelligence and skill is employed, and the results are entirely satisfactory, thereby showing its simplicity of construction and easy manipulation, which also in a measure explains its success for general use and to meet all conditions of the textile manufacturing trades.

Testing Oils.—On account of the keen competition in the oil trade at present, very often adulterations are found in the product as delivered to the mill, for which reason a few simple methods for testing the character of an oil will be handy. For testing olive oil, pour a little water into a saucer, and let a drop of the oil in question fall gently on the water. If the oil is pure, the shape of the drop will be irregular. If poppy oil, the drop in question will at first be round, but will soon dissolve into small particles. A drop of rape oil will have a similar shape, but the outlines of the particles will be more regular. Oil of ground nuts, which closely resembles olive oil and is thus frequently substituted for it, will be distinguished by giving a round drop accompanied by a number of smaller drops. Gingelly oil displays small drops, but which are smaller and far more numerous than those of ground-nut oil. Colza oil is round, with sharp, well defined outlines. Where oils above mentioned are mixed, the drop of the mixture will show a configuration approaching more or less to the details just given. When shaken in a bottle, oil that shows on the top surface a permanent collection of small air bubbles is not olive oil, but has been adulterated with poppy oil, since in pure olive oil such bubbles do not remain. Cotton seed oil is also used extensively as an adulterant in olive oil, and can be tested in the same manner. A very useful chemical test for olive oil is said to consist in mixing three parts of olive oil with one of nitric acid of specific gravity 1.32, and observing the color after one and one-half hours. If the oil is pure or mixed with lard or castor oil, a yellowish color will be obtained, but in the presence of cotton seed oil, sperm, seal, whale or mineral oil, a red color will be developed, varying in intensity with the proportion of the adulterant used. With cotton seed and seal oil, the color is more of

a reddish orange, while with mineral and fish oils, it is dark red.

Another method to show that a particular oil in question is unadulterated and a good lubricant is to stir up a portion of oil with 40 parts of a solution of carbonate of soda of 3° B. If the oil forms a milky emulsion, without any oily drops on the surface, it is a good lubricant for wool fibres.

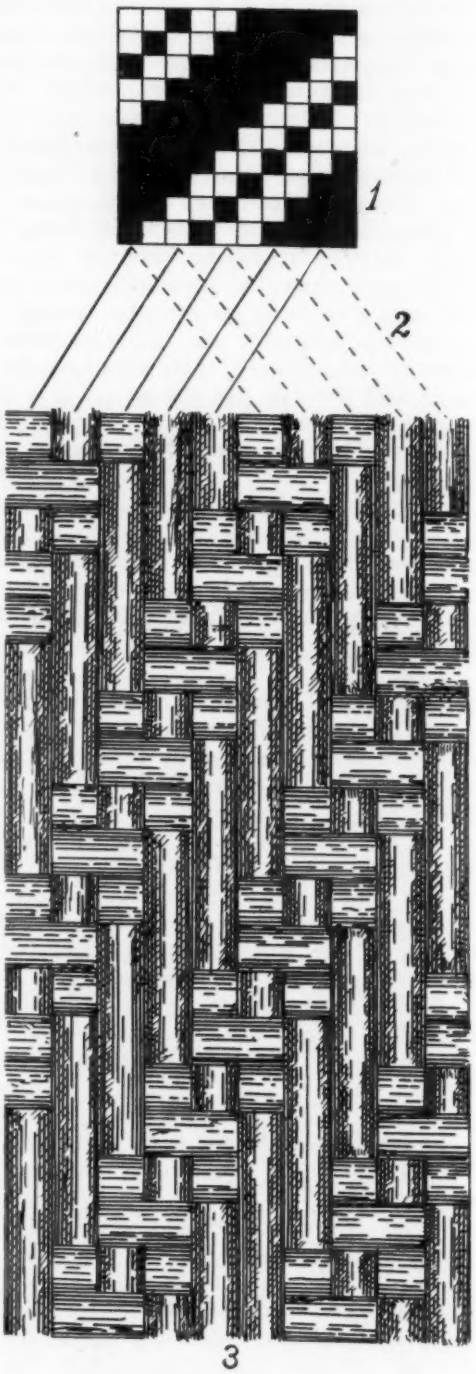
OUR TEXTILE DESIGN SCHOOL.

LESSON 4. DIAGONALS OBTAINED FROM ONE 45° TWILL.

These weaves are also technically known as 63° steep twills, and are very extensively used in the manufacture of textile fabrics, hence a proper explanation of their construction will be of the greatest interest to the student.

As the heading indicates these weaves have for the foundation the regular or 45° twills, and are obtained from said weaves by using every other warp-thread only for the diagonals. This rule will explain to the student that diagonals having for their foundation weaves, 45° twills of an even number of repeat, will require only one-half the number of harnesses for the diagonal as compared to the foundation twill; for which reason a 12 harness, 45° twill will produce a 6 harness diagonal; a 10 harness, 45° twill, a 5 harness diagonal, and so on. This reducing of the number of harnesses, in connection with diagonals produced from 45° twills having an even number of harnesses for their repeat, does not apply to 45° twills of an uneven number of warp threads for their repeat, since in this instance no reduction of the harnesses takes place, since after drafting all the uneven warp threads of the foundation weave for the diagonal, we in turn must then use the even warp threads of said foundation twill. For this reason a 13 harness twill will in turn produce a diagonal repeating on 13 warp threads, an 11 harness regular twill will produce an 11 harness diagonal, etc., etc. This feature of not being able to reduce the number of warp threads in the repeat, will be explained later on with diagrams 14–16.

Diagonals produced from 45° twills having an even number of warp threads for



their repeat, i.e., where a reduction of harnesses, required for the diagonals, takes place.

For explaining this subject, diagrams and weaves Fig. 1 to 13 are given, a study of which will readily explain to the student the construction of said diagonals.

Fig. 1 shows us one repeat of the common $\frac{5}{2}\frac{1}{2}$ 10 harness, 45° twill.

Diagram 2 shows the drafting required to produce its diagonal. This drafting is shown by means of solid and dotted lines, the solid lines showing the drafting for the first repeat, whereas the dotted lines refer to the second repeat of the diagonal, given to more clearly show up the fabric sketch, Fig. 3, of the diagonal.

Examining the weave, i.e., the 45° twill, vice versa the fabric sketch of the diagonal, we find as indicated by means of solid lines in diagram Fig. 2, that the

First warp thread of the 45° twill = the first warp thread in the fabric sketch of the diagonal.

Third warp thread of the 45° twill = the second warp thread in the fabric sketch of the diagonal.

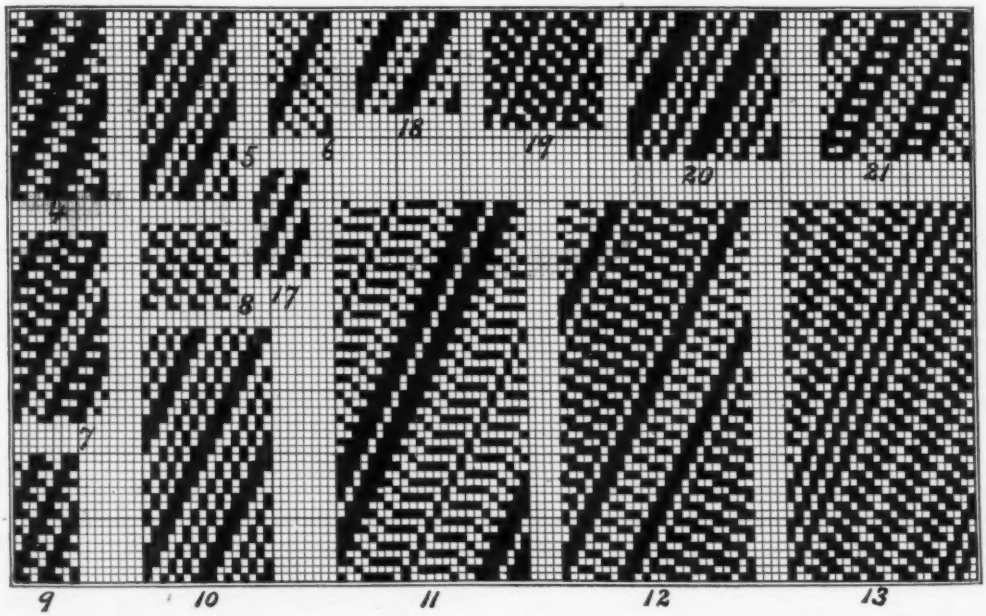
Fifth warp thread of the 45° twill = the third warp thread in the fabric sketch of the diagonal.

Seventh warp thread of the 45° twill = the fourth warp thread in the fabric sketch of the diagonal.

Ninth warp thread of the 45° twill = the fifth warp thread in the fabric sketch of the diagonal, i.e., the last warp thread required for producing one repeat of the diagonal.

We thus see that the 10 × 10 regular twill produces a 5 × 10 diagonal.

Having thus given a thorough explanation of the construction of diagonals we will in turn show a few practical examples of similarly constructed diagonals, in order to guide the studen



to be able to produce new effects in this line of weaves.

Weave Fig. 4 shows a diagonal repeating on 6 × 12, and having for its foundation the $\frac{6}{1}\frac{1}{2}\frac{1}{1}$ 12 harness 45° twill.

Weave Fig. 5 shows a similar diagonal repeating on 6 × 12, having for its foundation the $\frac{6}{2}\frac{2}{3}$ 12 harness 45° twill.

In connection with weaves Figs. 4 and 5, two repeats each way of the diagonal are given in order to more clearly bring up the respective weave to the student.

Weave Fig. 6 shows us a neat diagonal repeating on 8 × 16, and obtained from the

$^{5}_{2}{}^{1}_{2}{}^{1}_{2}{}^{1}_{2}$ 16 harness 45° twill. Only one repeat of this diagonal is given in this instance, on account of limited space for weaves on plate accompanying this article.

Weave Fig. 7 shows us a diagonal repeating on 12 × 24, calling for the $^{4}_{1}{}^{1}_{1}{}^{2}_{1}{}^{2}_{1}{}^{1}_{1}{}^{4}_{2}{}^{1}_{2}$ 24 harness 45° twill for its foundation, only one repeat of the diagonal is given, for the same reason as quoted in connection with weave Fig. 6.

Weave Fig. 8 shows us a weave constructed after the present system of weaves, which more properly could not be classified as a diagonal, since the interlacing of the warp and filling in this instance is of a well broken-up character, producing in the fabric what we might technically term a "tricot" effect, i.e., rib lines running filling ways in the fabric, on account of the complete break of the warp after every other pick. This weave repeating on 6 × 3 has for its foundation the $^{2}_{2}{}^{1}_{1}$ 6 harness 45° twill; four repeats warp ways, and 2 repeats filling ways of the diagonal being given in order to show this neat little weave more in detail to the student.

Weave Fig. 9 shows a very commonly used diagonal, repeating on 4 × 8, and which has for its foundation weave the $^{4}_{2}{}^{1}_{1}$ 8 harness regular twill. As mentioned before this is a very commonly used weave in connection with cotton, woolen, worsted and silk dress goods, as well as woolen and worsted fabrics for men's wear.

Weave Fig. 10 shows us a diagonal repeating on 8 × 16 obtained from the $^{5}_{2}{}^{2}_{2}{}^{2}_{3}$ 16 harness common twill. It is a good weave for worsted suitings. At a first glance the student may consider that there are two picks in a shed, but a careful examination will clearly show an overlapping of the warp threads in connection with the picks in the twill line effect of the weave.

Diagrams 11, 12 and 13 show more elaborate affairs, i.e., more prominent diagonal effects, as compared to the previously given examples, each and every one of the 3 weaves thus quoted forming excellent weaves for dress goods, and as fashion may designate now and then for men's wear.

Weave Fig. 11 repeats on 24 × 48 and has for its foundation the $^{1}_{1}{}^{6}_{2}{}^{6}_{1}{}^{1}_{2}{}^{1}_{2}{}^{1}_{1}{}^{1}_{1}{}^{1}_{1}{}^{1}_{2}{}^{2}_{2}{}^{1}_{1}$ $^{1}_{1}{}^{1}_{1}{}^{1}_{2}{}^{1}_{2}$ 48 harness regular twill.

Weave Fig. 12 calls for 24 warp threads, and 48 picks for its repeat, having for its foundation the $^{5}_{2}{}^{2}_{1}{}^{1}_{1}{}^{2}_{1}{}^{1}_{1}{}^{2}_{1}{}^{1}_{1}{}^{2}_{1}{}^{1}_{1}{}^{2}_{2}{}^{5}_{2}{}^{1}_{1}{}^{1}_{2}{}^{1}_{1}{}^{1}_{2}$ 48 harness common twill.

Weave Fig. 13 repeats on 24 × 48, and has for its foundation weave the $^{3}_{2}{}^{3}_{2}{}^{3}_{2}{}^{3}_{2}{}^{1}_{1}{}^{2}_{1}{}^{2}_{1}{}^{1}_{2}{}^{1}_{1}{}^{2}_{1}{}^{2}_{1}$ $^{1}_{1}{}^{1}_{2}{}^{1}_{1}{}^{2}_{1}{}^{2}_{1}{}^{1}_{1}{}^{1}_{2}$ 48 harness 45° twill.

Diagonals produced from 45° twills having an uneven number of warp threads for their repeat, i.e., where no reduction of harnesses takes place.

This system of designing diagonals from 45° twills is readily explained by means of Diagram 14–15–16 and of which Fig. 14 shows one repeat of the $^{4}_{2}{}^{2}_{1}{}^{2}_{2}$ 13 harness 45° twill.

Fig. 15 shows the drafting necessary to produce the diagonal (see Fig. 16) from the 45° twill. It will be clearly seen from Diagram 15 that the

First warp thread of the 45° twill = the first warp thread in the fabric sketch of the diagonal.

Third warp thread of the 45° twill = the second warp thread in the fabric sketch of the diagonal.

Fifth warp thread of the 45° twill = the third warp thread in the fabric sketch of the diagonal.

Seventh warp thread of the 45° twill = the fourth warp thread in the fabric sketch of the diagonal.

Ninth warp thread of the 45° twill = the fifth warp thread in the fabric sketch of the diagonal.

Eleventh warp thread of the 45° twill = the sixth warp thread in the fabric sketch of the diagonal.

Thirteenth warp thread of the 45° twill = the seventh warp thread in the fabric sketch of the diagonal.

Having thus gone over the regular twill once, calling for every uneven warp thread of said weave, we next in turn have to take every even warp thread of the regular twill, i.e., finish the repeat of the diagonal fabric, and what calls for

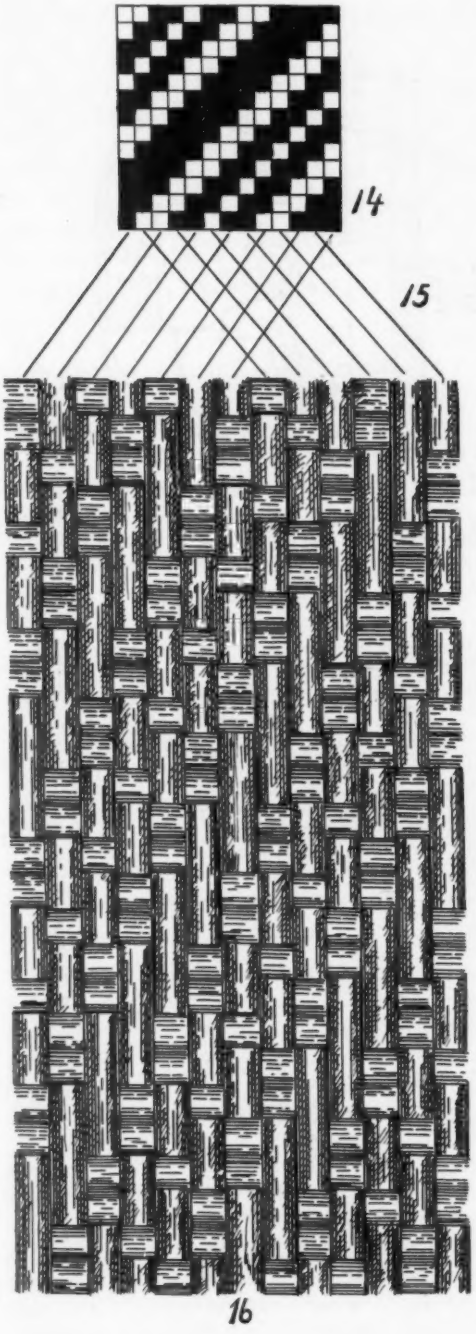
Second warp thread of the 45° twill = the eighth warp thread in the fabric sketch of the diagonal.

Fourth warp thread of the 45° twill = the ninth warp thread in the fabric sketch of the diagonal.

Sixth warp thread of the 45° twill = the tenth

warp thread in the fabric sketch of the diagonal.

Eighth warp thread of the 45° twill = the eleventh warp thread in the fabric sketch of the diagonal.



Tenth warp thread of the 45° twill = the twelfth warp thread in the fabric sketch of the diagonal.

Twelfth warp thread of the 45° twill = the thirteenth warp thread in the fabric sketch of the diagonal.

This method of drafting diagonals from 45° twills of an uneven number of warp threads for its repeat can be also technically styled "drafting" the new weave from a foundation weave by means of a satin draw, taking "2" as a counter. Thus in the present example

$$13 = 2 + 11.$$

Counting off with 2 we get:—

$1 + 2 = 3 + 2 = 5 + 2 = 7 + 2 = 9 + 2 = 11 + 2 = 13 + 2 = 15 = 2 + 2 = 4 + 2 = 6 + 2 = 8 + 2 = 10 + 2 = 12 + 2 = 14 = 1$ i.e., using the warp threads of the foundation weave for the new weave in the following rotation: — 1–3–5–7–9–11–13–2–4–6–8–10–12.

This procedure of using a satin draw in connection with a regular twill of an uneven number of repeat, for the construction of their mate diagonals, will readily explain the procedure for obtaining its diagonal from any 45° twill of an uneven number of warp threads and picks repeat. Having thus explained the construction of diagonals from regular twills of an uneven number repeat, we in turn will show in connection with weave 17–21 five practical examples of such diagonals and of which

Weave Fig. 17 repeating on 7×7 calls for the $\frac{1}{3}$ 7 harness, regular twill for its foundation weave.

Weave Fig. 18 repeats on 13×13 and calls for the $\frac{2}{3}\frac{1}{3}$ 13 harness, common twill for its foundation.

Weave Fig. 19 repeats on 15×15, having for its foundation the $\frac{3}{1}\frac{2}{1}\frac{2}{1}\frac{3}{2}$ 15 harness, 45° twill.

Weave Fig. 20 repeats on 19×19, and has for its foundation $\frac{1}{3}\frac{3}{2}\frac{2}{2}$ 19 harness, 45° twill.

Weave Fig. 21 repeats on 19×19, and has the $\frac{1}{2}\frac{1}{2}\frac{1}{2}\frac{1}{1}\frac{1}{1}$ 19 harness, 45° twill for its foundation.

Having thus given a thorough explanation of the construction of these weaves, it will be most

important for the student to construct the diagonals from the following foundation twills:—

LESSON

1. Construct the diagonal repeating on 8 × 16, as obtained from the $\frac{5}{2}\frac{1}{2}\frac{2}{4}$ 16 harness, 45° twill.

2. Construct the diagonal repeating on 10 × 20 as obtained from the $\frac{1}{2}\frac{1}{1}\frac{2}{1}\frac{2}{2}\frac{1}{2}\frac{1}{1}\frac{2}{1}$ 20 harness, 45° twill.

3. Construct the diagonal repeating on 11 × 22, as obtained from the $\frac{4}{4}\frac{2}{1}\frac{2}{1}\frac{1}{2}\frac{1}{1}\frac{2}{1}$ 22 harness, 45° twill.

4. Construct the diagonal repeating on 12 × 24, as obtained from the $\frac{7}{2}\frac{1}{1}\frac{1}{1}\frac{2}{1}\frac{2}{1}\frac{1}{1}\frac{1}{2}$ 24 harness, 45° twill.

McBRIDE'S AUTOMATIC FEED FOR WOOLEN CARDS.

This feed for woolen cards is based on the well known Apperly feed and provides feed rolls which traverse the feed apron diagonally back and forth and lay the sliver on said apron, no latches being required at the ends of the traverse to hold the sliver from being dragged out of place by the return traverse, since the rolls deliver the sliver at a speed corresponding with the speed of the traverse. The pressure of the rolls against each other is spring controlled, so that they will automatically adapt themselves to different sizes of sliver or to any irregularities in the sliver.

The accompanying illustrations will show the details of the arrangement, Fig. 1 being a side view of the mechanism, while Fig. 2 is a plan view of the feed roll driving arrangement, showing the method by which the feed rolls automatically adjust themselves to different sizes of sliver.

Referring to the illustrations, 1 indicates the traveler which carries all of the feed roll mechanism that is movable, said traveler being moved along on the guide rod 2 by means of a pin 3, attached to side of the driving band 4, fitting loosely into a slot 5 in the traveler. The driving band 4 is driven through the roll 6 from a train of gearing, the other roll 7 simply acting as a carrier. The lower part of the traveler is provided with a plate 8, the shape of which is shown better in Fig. 2. This plate is pivoted at 9 and carries the bearings 10 and 11 for the fluted feed rolls 12 and 13, said rolls being held by means of nuts 14 and 15 so that they may rotate vertically. The rolls are kept pressed against each other by springs 16 and 17 pressing against the respective bearings, which allows different sizes of sliver to be passed through without any further adjustment. On the same studs with the rolls 12 and 13 are the gears 18 and 19 respectively which are in mesh with each other and one at a time with the rack 20, being kept in contact with the rack by means of

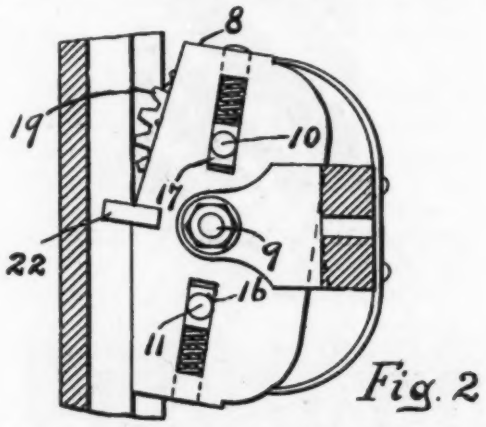


Fig. 2

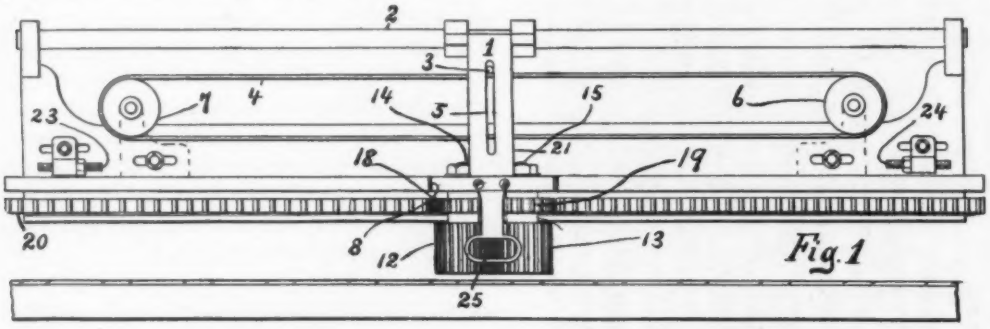
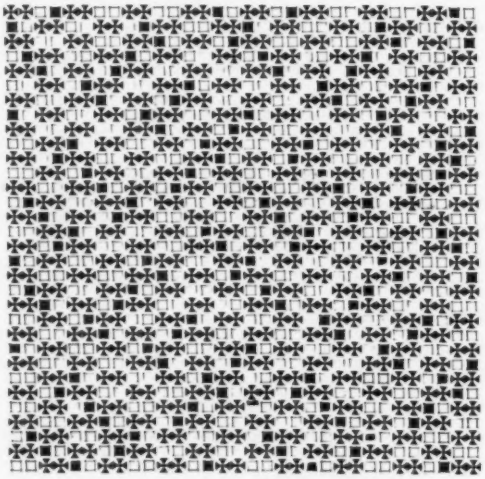


Fig. 1

a spring 21. As the traveler moves across the feed apron, the feed rolls are revolved by one of the gears mentioned being in contact with the rack and in order to have them always revolve in the same direction, when one end of the traverse is reached, a pin 22 on the plate 8 strikes against a projection or stop 23 or 24, as the case may be, and throws the gear which is in contact with the rack out of contact and the other one in, so that as the return traverse is commenced, the rolls will continue to revolve in the same direction. The return traverse is obtained by the pin 3 continuing to travel, which brings it back on the under side and it occupies a lower position in the slot 5 in the traveler. A reversal takes place at each end of the traverse as explained. In order to keep the sliver always between the rolls, a guide 25 is provided in front and a trumpet (not shown) at the back of the rolls.

NOVELTIES FROM FOREIGN SOURCES.

Worsted Dress Goods.



Complete Weave. Repeat 16 × 16.

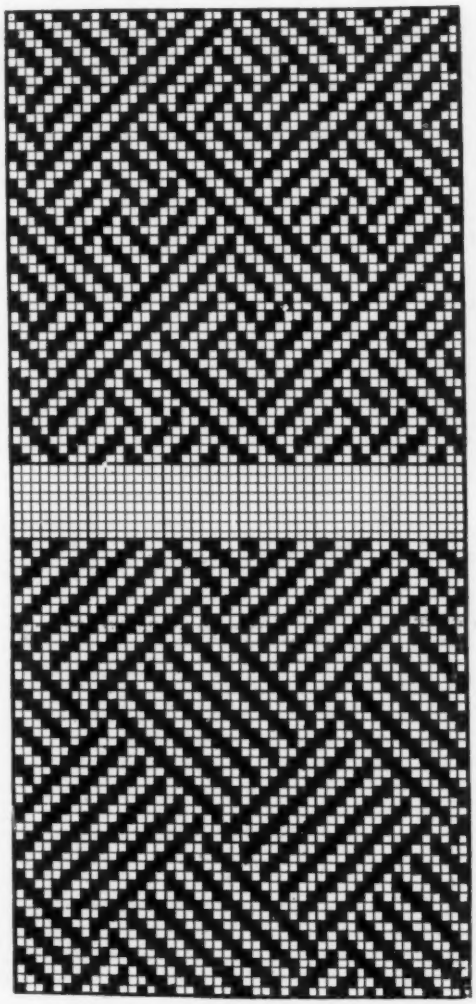
Warp : — 2860 ends, single 36's worsted, dark blue shade No 1, 16 harness, straight draw or 8 harness, fancy draw.

Reed : — 28 × 2 = 51 inches wide in loom.

Filling : — 63 picks per one inch, all single 40's worsted, dark blue shade No. 2.

Finish : — Worsted finish, 44 inches wide.

Fancy Dress Goods.



Complete Weave. Repeat 24 × 24.

Use either one of the two specimens of weaves given.

Warp : — 2640 ends, 24 harness, straight draw.

Reed : — 17½ × 3 = 50½ inches wide in reed.

Dress :—

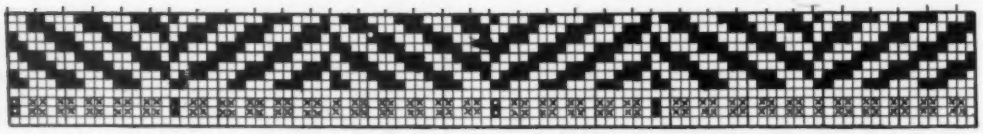
1 end, 2/100's black and white cotton twist, twisted over with 1/30's worsted, light blue.
1 end, 1/28's worsted, lavender.
1 end, 2/100's black and white cotton twist, twisted over with 1/30's worsted, gold.
1 end, 1/28's worsted, lavender.
1 end, 2/100's black and white cotton twist, twisted over with 1/30's worsted, light blue.
12 ends, 1/28's worsted, lavender.

17 ends in repeat of pattern.

Filling : — 48 picks per inch, all single 24's worsted light shade of buff.

Finish : — Scour, singe face and press, 44 inches wide.

Fancy Dress Goods.



Repeat of weave 34 × 4.

Warp :— 1428 ends, 12 harness fancy draw.

Reed :—10 × { 1 dent @ 2 ends / 5 dents @ 3 ends } as indicated by dashes below weave.

6 dents = 17 ends = 50½ in. wide in reed.

Dress :—

1 end, A } × 5 = 15 ends.
2 ends, B }
1 end, A ..... = 1 end.
1 end, B ..... = 1 end.
1 end, A } × 5 = 15 ends.
2 ends, B }
1 end, A ..... = 1 end.
1 end, C ..... = 1 end.
1 end, A } × 5 = 15 ends.
2 ends, B }
1 end, A ..... = 1 end.
1 end, D ..... = 1 end.

51 ends in repeat of pattern.

Description of yarns used.

A — see □ type in color scheme, above weave, = twist composed of single 10's bunched, white, mercerized cotton and single 60's cotton, black.

B — see ☒ type in color scheme, above weave, = 2/80's cotton, black and white, twist.

C — see ■ type in color scheme, above weave, = 2/20's cotton, white, twisted with green silk (24,000 yards per lb.) the latter forming heavy bunches 2 inches apart (take up of silk: cotton = 5: 1). This fancy d and tw. thread overtwisted with (6 turns per inch) single 30's cotton, white.

D — see ⧈ type in color scheme, above weave, = the same fancy thread as for C, only pink silk in place of green.

Filling : — 30 picks, 2/26's worsted black.

Finish : — 44 inches wide.

Worsted Suiting.

Complete Weave. Repeat 4 × 4.

Warp : — 3772 ends, 12 harness, straight draw.

Reed : — 14½ × 4 = 65 inches wide in loom.

Dress :—

3 ends, single 36's worsted, black, with 2/80's cotton, mercerized, pearl twist..... = 3 ends.
2 ends, 2/36's worsted, dark blue..... = 2 ends.
1 end, single 36's worsted, black, with 2/80's cotton, mercerized, pearl twist } × 10 = 40 ends.
3 ends, 2/36's worsted, dark blue.....
1 end, single 36's worsted, black, with 2/80's cotton mercerized, pearl, twist..... = 1 end.
2 ends, 2/36's worsted, dark blue..... = 2 ends.
3 ends, single 36's worsted, black, with 2/80's cotton, mercerized, pearl, twist..... = 3 ends.
2 ends, 2/36's worsted, dark blue..... = 2 ends.
1 end, single 36's worsted, black, with 2/80's cotton, mercerized, pearl twist } × 2 = 8 ends.
3 ends, 2/36's worsted, dark blue.....
1 end, single 36's worsted, black, with 2/80's cotton, mercerized, pearl, twist..... = 1 end.
2 ends, 2/36's worsted, dark blue..... = 2 ends.
1 end, 2/64's worsted, brownorange..... = 1 end.
1 end, single 36's worsted, black, with 2/80's cotton, mercerized, pearl, twist..... = 1 end.
3 ends, 2/36's worsted, dark blue..... = 3 ends.
1 end, single 36's worsted, black, with 2/80's cotton, mercerized, pearl, twist..... = 1 end.
3 ends, 2/36's worsted, dark blue..... = 3 ends.
1 end, single 36's worsted, black, with 2/80's cotton, mercerized, pearl, twist..... = 1 end.
2 ends, 2/36's worsted, dark blue..... = 2 ends.
1 end, 2/64's worsted, brownorange..... = 1 end.
1 end, single 36's worsted, black, with 2/80's cotton, mercerized, pearl twist } × 3 = 13 ends.
3 ends, 2/36's worsted, dark blue.....
1 end, single 30's worsted, black, with 2/80's cotton, mercerized, pearl, twist..... = 1 end.
2 ends, 2/36's worsted, dark blue..... = 2 ends.

Repeat of pattern : 96 ends.

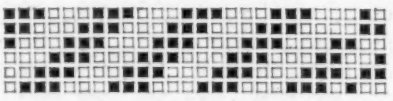
Filling : — 57 picks per inch, arranged thus :

1 pick, single 36's worsted, black, with 2/80's cotton, mercerized, pearl, twist..... = 1 pick.
1 pick, 2/36's worsted, dark blue..... = 1 pick.
1 pick, single 36's worsted, black, with 2/80's cotton, mercerized, pearl, twist..... = 1 pick.
13 picks, 2/36's worsted, dark blue..... = 13 picks.
1 pick, 2/64's worsted, brownorange..... = 1 pick.
7 picks, 2/36's worsted, dark blue..... = 7 picks.
1 pick, 2/52's worsted, black and orange..... = 1 pick.
7 picks, 2/36's worsted, dark blue..... = 7 picks.
1 pick, 2/64's worsted, brownorange..... = 1 pick.
15 picks, 2/36's worsted, dark blue..... = 15 picks.
1 pick, single 36's worsted, black, with 2/80's cotton, mercerized, pearl, twist..... = 1 pick.
1 pick, 2/36's worsted, dark blue..... = 1 pick.
1 pick, single 36's worsted, black, with 2/80's cotton, mercerized, pearl, twist..... = 1 pick.
45 picks, 2/36's worsted, dark blue..... = 45 picks.

Repeat of pattern : 96 picks.

Finish : — Worsted finish, 56 inches wide.

Worsted Trousering.



Complete Weave. Repeat 26 × 6.

Warp : — 5020 ends.

Reed : — 23 { 1 dent, @ 4 ends. / 5 dents, @ 3 ends. / 1 dent, @ 4 ends. / 1 dent, @ 3 ends. }

8 dents, = 26 ends = 67 in. wide in reed.

Dress :—

2 ends, 2/60's worsted, black..... = 2 ends.
1 end, 2/60's worsted, gray and white
3 ends, 2/60's worsted, black and slate
2 ends, 2/60's worsted, gray mix,..... } × 2 = 16 ends.
2 ends, 2/60's worsted, gray and white.
1 end, 2/60's worsted, gray and white..... = 1 end.
2 ends, 2/60's worsted, black and slate..... = 2 ends.
3 ends, 2/60's worsted, black..... = 3 ends.
2 ends, 100/2's white silk..... = 2 ends.

Repeat of pattern : 26 ends.

Filling :—82 picks per inch, all plain 2/30's worsted, black.

Finish : — Worsted finish, 56 inches wide.

Worsted Suiting.

Complete Weave. Repeat 2 × 2.

Warp : — 2700 ends, 8 harness, straight draw.

Reed : — 21 × 2 = 65 inches wide in loom.

Dress : —

2 ends, 2-fold, 2/80's white mercerized cotton..... = 2 ends.
2 ends, 2/32's worsted, light and dark gray mix..... = 2 ends.
2 ends, 2/32's worsted, white and gray mix.....
1 end, 2/48's worsted, white and orange..... × 2 = 8 ends.
1 end, 2/32's worsted, light and dark gray mix.
2 ends, 2-fold, 2/80's white mercerized cotton..... = 2 ends
2 ends, 2/32's worsted, light and dark gray mix.....
2 ends, 2/32's worsted, white and gray mix..... × 2 = 8 ends × 7 = 84 ends.
2 ends, 2/32's worsted, light and dark gray mix..... = 2 ends

Repeat of pattern : 96 ends.

Filling : — 45 picks per inch :—

2 picks, 2/32's worsted, white and gray mix.....
1 pick, 2/48's worsted white and orange..... × 2 = 8 picks.
1 pick, 2/32's worsted, light and dark gray mix
2 picks, 2/32's worsted, white and gray mix....
2 picks, 2/52's worsted, light and dark gray mix × 28 = 112 picks.

Repeat of pattern : 120 picks.

Finish : — Worsted finish, 56 inches wide.

Worsted Melton Suiting.

Complete Weave. Repeat 4 × 4.

Warp — 4150 ends, 12 or 16 harness, straight draw.

Reed : — 15 × 4 = 69 inches wide in loom.

Dress : —

1 end, 2/48's worsted, black..... = 1
1 end, 80/2's silk, white..... = 1
1 end, 2/48's worsted, gray and white..... = 1
1 end, 2/48's worsted, black..... = 1
1 end, 80/2's silk, white..... = 1
1 end, 2/48's worsted, black..... = 1
1 end, 2/48's worsted, gray and white..... = 1
1 end, 80/2's silk, white..... = 1
1 end, 2/48's worsted, black..... = 1
1 end, 2/48's worsted, gray and white
1 end, single 48's worsted, black and 40/1 silk, white, twist ..... × 4 = 8
1 end, 2/48's worsted, black..... = 1
1 end, 80/2's silk, white..... = 1
1 end, 2/48's worsted, black..... = 1
1 end, single 48's worsted, black, and 40/1 silk, white, twist × 2 = 4 × 2 = 16
1 end, 2/48's worsted, gray and white
1 end, single 48's worsted, black and 40/1 silk, white, twist..... = 1
1 end, 2/48's worsted, gray and white..... = 1
1 end, single 48's worsted, black, and 40's silk, white, twist..... = 1
1 end, 2/48's worsted, gray and white..... = 1 × 2 = 72 ends.
1 end, 2/48's worsted, black..... = 1 end.
1 end, 80/2's silk, white..... = 1 end.
1 end, 2/48's worsted, gray and white..... = 1 end.
1 end, 2/48's worsted, black..... = 1 end.
1 end, 80/2's silk, white..... = 1 end.
1 end, 2/48's worsted, black..... = 1 end.
1 end, 2/48's worsted, gray and white..... = 1 end.
1 end, 80/2's silk, white..... = 1 end.
1 end, 2/48's worsted, black..... = 1 end.
1 end, 2/48's worsted, gray and white.....
1 end, single 48's worsted, black, and 40/1 silk, white, twist..... × 4 = 8 ends.
1 end, 2/48's worsted, black..... = 1 end.
1 end, 80/2's silk, white..... = 1 end.
1 end, 2/48's worsted, black..... = 1 end.
1 end, single 48's worsted, black, and 40/1 silk, white, twist.....
1 end, 2/48's worsted, white and bluegreen..... = 1 end.
1 end, single 48's worsted, black, and 40/1 silk, white, twist..... = 1 end.
1 end, 2/48's worsted, gray and white..... = 1 end.
1 end, 2/48's worsted, black..... = 1 end.
1 end, 80/2's silk, white..... = 1 end.
1 end, 2/48's worsted, black..... = 1 end.
1 end, single 48's worsted, black, and 40/1 silk, white, twist..... = 1 end.
1 end, 2/48's worsted, white and bluegreen..... = 1 end.
1 end, single 48's worsted, black, and 40/1 silk, white, twist..... × 3 .... = 6 ends.
1 end, 2/48's worsted, gray and white .....

Repeat of pattern : 108 ends.

Filling : — 60 picks per inch, arranged thus :

1 pick, 2/48's worsted, black and bluegreen ..... = 1 pick.
1 pick, 2/48's worsted, black and white.....
1 pick, 2/48's worsted, dark gray mix ..... × 4 ... = 8 picks.
1 pick, 2/48's worsted, black and white..... = 1 pick.
1 pick, 2/48's worsted, black and bluegreen..... = 1 pick.
1 pick, 2/48's worsted, black and white.....
1 pick, 2/48's worsted, dark gray mix..... × 64 .. = 128 picks.
1 pick, 2/48's worsted, black and white..... = 1 pick.

Repeat of pattern : 140 picks.

Finish : — Worsted melton finish, 57 inches wide.

Worsted Suiting.

Complete Weave. Repeat 4 × 4.

Warp : — 3750 ends, all 2/40's worsted.

Reed : — 29 × 2 = 64½ inches wide in loom.

Dress : —

1 end, light and dark gray mix.....
1 end, black..... × 8 = 16 ends.
1 end, light and dark gray mix.....
1 end, dark gray mix..... × 4 = 8
1 end, light and dark gray mix..... = 1
1 end, black .....
1 end, light and dark gray mix..... × 2 = 4
1 end, light and dark gray mix..... = 1
2 ends, black ..... = 2
1 end, light and dark gray mix.....
1 end, black ..... × 2 = 4 × 2 = 48 ends.
1 end, light and dark gray mix..... = 1
1 end, light and dark gray mix..... = 1
2 ends, black ..... = 2
1 end, light and dark gray mix.....
1 end, dark gray mix..... × 4 = 8 ends.
1 end, light and dark gray mix..... = 1 end.
1 end, black .....
2 ends, light and dark gray mix..... × 5 = 15 ends.
1 end, black ..... = 1 end.
1 end, black and blue.....
1 end, light and dark gray mix..... × 3 = 6 ends.
1 end, black and blue..... = 1 end.
1 end, light and dark gray mix.....
1 end, black ..... × 8 = 16 ends.
1 end, light and dark gray mix.....
1 end, dark gray mix..... × 4 = 8
1 end, light and dark gray mix..... = 1
1 end, black .....
1 end, light and dark gray mix..... × 2 = 4
1 end, light and dark gray mix..... = 1
2 ends, black ..... = 2 × 2 = 48 ends
1 end, light and dark gray mix.....
1 end, black ..... × 2 = 4
1 end, light and dark gray mix..... = 1
1 end, light and dark gray mix..... = 1
2 ends, black ..... = 2
1 end, light and dark gray mix.....
1 end, dark gray mix..... × 4 = 8 ends.
1 end, light and dark gray mix..... = 1 end.
1 end, black .....
2 ends, light and dark gray mix..... × 5 = 15 ends.
1 end, black ..... = 1 end.
1 end, black and green .....
1 end, light and dark gray mix..... × 3 = 6 ends.
1 end, black and green ..... = 1 end.

Repeat of pattern : 192 ends

Filling:—62 picks per inch, all 2/40's worsted, arranged thus:

1 pick, light and dark gray mix..... } × 10 = 20
1 pick, black..... }
1 pick, light and dark gray mix..... } × 4 = 8 } × 3 = 84 picks.
1 pick, dark gray mix..... }

1 pick, light and dark gray mix..... }
1 pick, black ..... } × 10....= 20 pick.
1 pick, light and dark gray mix ..... }
1 pick, black and green .... } × 4....= 8 picks.

1 pick, light and dark gray mix ..... } × 10 = 20
1 pick, black..... }
1 pick, light and dark gray mix..... } × 4 = 8 } × 3 = 84 picks.
1 pick, dark gray mix ..... }

1 pick, light and dark gray mix ..... }
1 pick, black ..... } × 10....= 20 picks.
1 pick, light and dark gray mix..... }
1 pick, black and blue..... ..... } × 4....= 8 picks.

Repeat of pattern: 224 picks.

Finish:—Worsted finish, 56 inches wide.

Woolen Cheviot Suiting.

Complete Weave.

Repeat 4 × 4.

Warp:—1,875 ends, all 2/16's worsted cheviot yarn.
Reed:—15 × 2 = 62½ inches wide in loom.
Dress:—

3 ends, black and white twisted..... = 3 ends.
1 end, black..... = 1 end.
1 end, brown and yellow twisted ..... = 1 end.
1 end, blue ..... = 1 end.
1 end, brown and yellow twisted ..... = 1 end.
1 end, black .... = 1 end.

1 end, black and white..... }
1 end, black ..... }
1 end, white and green ..... } × 2 = 8 ends.
1 end, black .... }

1 end, brown and yellow ..... } × 4 = 8 ends.
1 end, black ..... }

1 end, black and white ..... = 1 end.
1 end, black ..... = 1 end.
1 end, white and green ..... = 1 end.
1 end, black ..... = 1 end.
1 end, black and white ..... = 1 end.
1 end, black ..... = 1 end.
1 end, white and green ..... = 1 end.
1 end, blue ..... = 1 end.

Repeat of pattern: 32 ends.

Filling:—37 picks per inch, all 2½ run woolen yarn, dark blue.
Finish:—Cheviot finish, scour well, clip on shear, finished width 56 inches.

Cheviot Trousering.

Complete Weave.

Repeat 4 × 4.

Warp:—1792 ends, 8 harness straight draw.
Reed:—13 × 2 = 69 inches wide in loom.
Dress:—

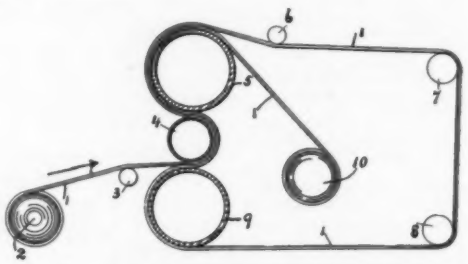
1 end, 1¾ run black.
2 ends, 1¾ run medium gray.
1 end, 1¾ run pearl.
1 end, 1¾ run medium gray.
1 end, 1¾ run pearl.
2 ends, double twist, 5 run black and 3½ run pearl.
1 end, 1¾ run medium gray.
1 end, 1¾ run pearl.
1 end, 1¾ run medium gray.
1 end, 1¾ run pearl.

12 ends in repeat of pattern.

Filling:—34 picks per 1 inch, all 2/20's cheviot, worsted, black.
Finish:—Worsted, cheviot finish, 56 inches wide.

IMPROVED METHOD OF FINISHING SATINS.

This method of finishing is used for producing a high lustre on satins and similar fabrics, and consists principally in the way in which the fabric is run through the calendering machine.



A diagram of one method of passing the cloth through the machine is shown in the accompanying illustration. In the same cloth 1 which is brought to the machine on a roll 2, is passed in the direction of the arrow over a guide roller 3 to the hollow metallic roller 4, which is heated, the face of the fabric being on the lower side. The fabric is then passed over the large compressed paper roller 5, under a guide roller 6, over guide roller 7 and under another guide roller 8 to the bottom side of the other compressed paper roller 9 and from there it goes up and around on the outside of the layer of cloth on the roll 4, then on to the roller 5 between the first layer of cloth and the surface of the roller, from which point it is guided to the beam 10 on which it is wound. It will be seen on examination of the course of the fabric through the machine that the back of the first layer of said fabric on the roller 4 is against the surface of said roller 4 and the face of the first layer is against the back of the second layer. The face of the second layer is against the paper roller 5, its back side being in contact with the face of the first layer. By thus having the fabric pass twice around the rolls as explained, while the layers are in contact with each other, a very high surface finish is imparted to the face of the satin, which enables the after pressing with hydraulic pressure to be dispensed with, the latter process having previously been necessary in order to get the desired finish.

The surface speeds of all the rolls are the same, and which rolls are driven by suitable gearing as in all calendering machines.

JACQUARD EFFECTS PRODUCED ON THE HARNESS LOOM.

HAVING BROKEN TWILLS DERIVED FROM EVEN-SIDED 45° TWILLS FOR THEIR FOUNDATION.

As above mentioned, the foundation for designing these weaves are our common even-sided twills, broken either warp ways only (stripe-effects) or warp and filling ways (check-effects), as the case may require; the last mentioned arrangement being the one which will result in the most fancy effects. In selecting the foundation weave, it is advisable to use for this purpose well broken up effects, i.e., twills showing 2, 3 or more different twill lines in one repeat of the weave, since the more broken up the foundation weave selected, the more elaborate the result of the final novelty weave will be.

Another feature to be kept in mind when designing for these novelty weaves is, to vary considerably the dimensions of the twill pieces as running either from / or \, thus increasing the repeat of the new weave. The affair of how to construct these weaves will be best explained by means of a few practical examples, thus showing how to construct any number of new weaves in a similar manner.

STRIPE EFFECTS.

Weave Fig. 1 shows a neat stripe effect, having for its foundation the $^{2}_{3}{}^{2}_{2}{}^{1}_{1}$ 12 harness 45° twill. Arranging this weave to run for a certain number of threads from / and then break, will then call for its mate twill for the $^{3}_{3}{}^{2}_{2}{}^{2}_{1}{}^{1}$ 45° twill = for the reverse twill, i. e. twill \. The arrangement observed in constructing weave Fig. 1 is six ends / twill to alternate with 5 ends \ twill, resulting in the repeat of the weave 132 x 12 and which in turn calls for 24 harness fancy draw thus: *1 2 3 4 5 6* 20 21 22 23 24 *2 3 4 5 6 7* 19 20 21 22 23 *3 4 5 6 7 8* 18 19 20 21 22 *4 5 6 7 8 9* 17 18 19 20 21 *5 6 7 8 9 10* 16 17 18 19 20 *6 7 8 9 10 11* 15 16 17 18 19 *7 8 9 10 11 12* 14 15 16 17 18 *8 9 10 11 12 1* 13 14 15 16 17 *9 10 11 12 1 2* 24 13 14 15 16 *10 11 12 1 2 3* 23 24 13 14 15 *11 12 1 2 3 4* 22 23 24 13 14 *12 1 2 3 4 5* 21 22 23 24 13.

CHECK EFFECTS.

Weave Fig. 2 shows the construction of such effects, giving at the same time drawing-in draft and harness-chain of the new weave. The foundation of the new weave is the combination of

6 warp threads and 6 picks } of the $^{2}_{1}{}^{2}_{1}{}^{1}_{2}{}^{1}_{2}$ 12 harness 45° twill / to alternate with

4 warp threads and 4 picks } of the $^{2}_{1}{}^{2}_{2}{}^{1}_{2}{}^{1}_{1}$ 12 harness 45° twill \.

Repeat of the new combination weave, 60 warp threads and 60 picks.

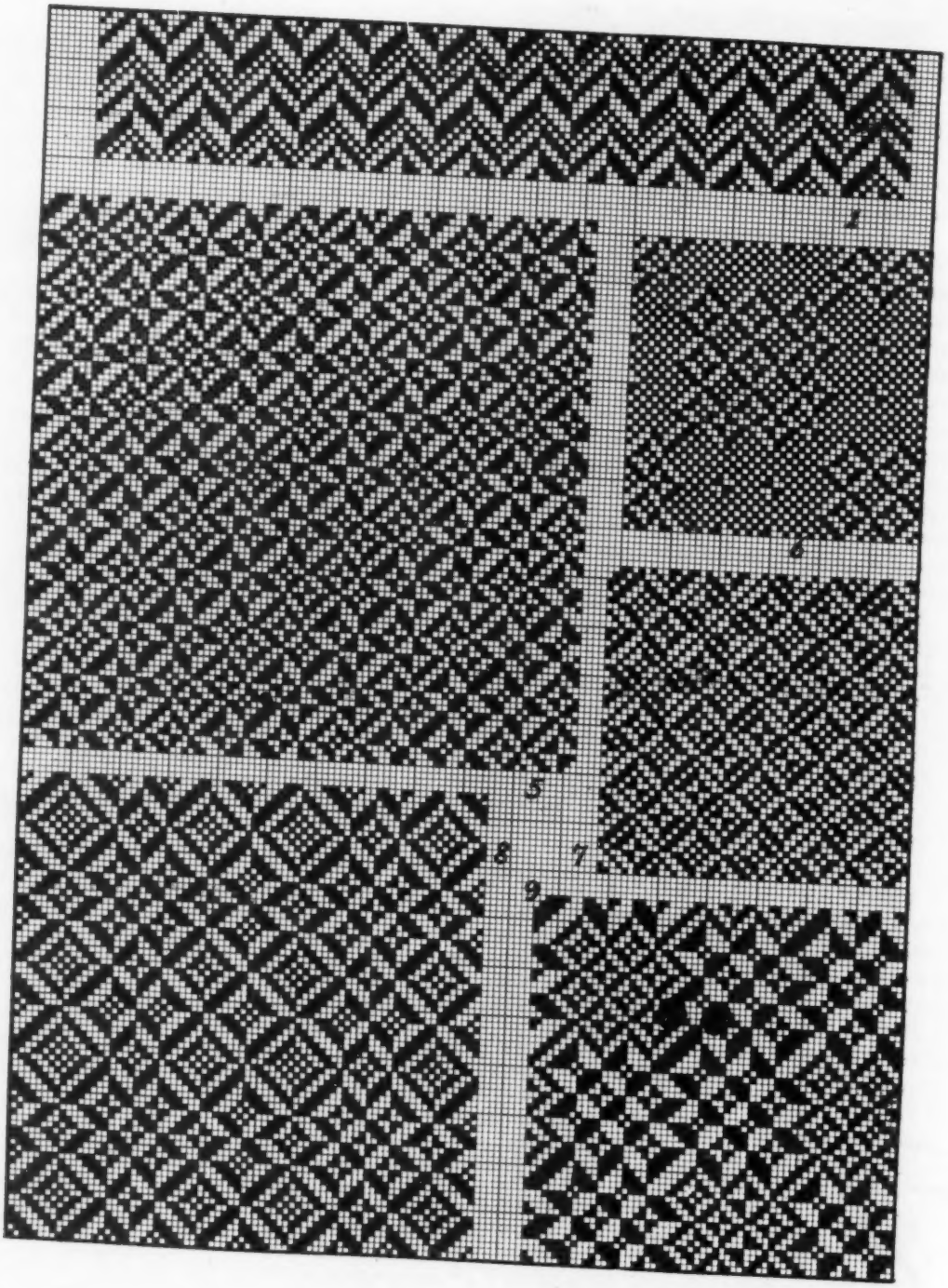
Fig. 3 shows the drawing-in draft to produce this weave with 24 harness. ⊠ type shows the drafting for the 6 ends / twill, and ⊡ type that for the 4 ends \ twill.

Weave Fig. 4 shows the harness chain for producing weave Fig. 2, in connection with draft Fig. 3, on 24 harness × 60 picks.

Weave Fig. 5 shows a very neat well broken-up effect for this class of weaves. The foundation is the $^{2}_{3}{}^{3}_{2}$ 10 harness 45° twill, arranged to break off warp and filling ways 6 / and 3 \. Repeat of weave 90 warp threads and 90 picks, requiring 20 harness fancy draw for its execution on the loom.

Weave Fig. 6 is another weave of this class having for its foundation the $^{1}_{1}{}^{2}_{2}{}^{1}_{1}$ 8 harness 45° twill, arranged to break off warp and filling ways 4/2\6/4\4/4\. Repeat of weave 48 × 48, calling for 16 harness fancy draw for its execution on the loom.

In connection with weave Fig. 7 an excellent type of this class of weaves is shown, in this instance using a foundation weave which on account of its foundation will considerably decrease the number of harnesses required. The foundation weave employed is the $^{1}_{2}{}^{2}_{1}{}^{2}_{2}$ 10 harness 45° twill, drafted 6/4\ both warp and filling ways. This weave on account of its equal construction both ways, will call for the same weave when running the twill in one or the other direction, and for which reason the

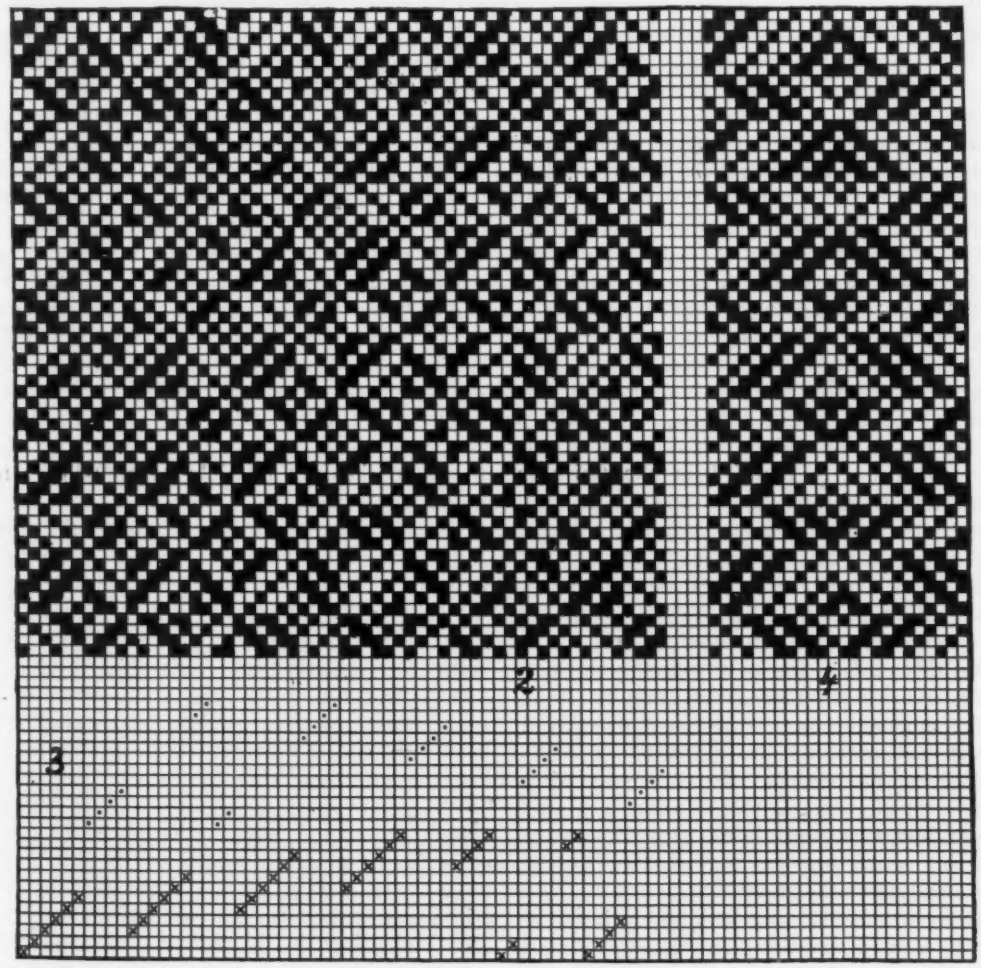

1
6
5
8
7
9

drawing-in draft will call for only 10 harnesses, certainly few harnesses for producing such an elaborate design.

Weave Fig. 8 has for its foundation the $^{2}_{2}{}^{3}_{3}{}^{1}_{1}$ 12 harness regular twill, drafted thus: 8/8\4/4\7/7\, repeating on 38 warp threads and 38 picks, 2 repeats of the weave being shown in our diagram. This weave calls for 24 harness fancy draw.

Weave Fig. 9 shows another very neat weave of this class, having for its foundation the $^{2}_{4}{}^{1}_{2}$ 12 harness 45° twill, drafted 8/4\4/4\. Repeat of weave 60 × 60, which by means of its proper fancy draw can be executed on 24 harness on the loom.

We have only quoted the number of harness required for weaves Fig. 5–9, for the fact that drawing-in draft Fig. 3 as given in connection with weave Fig. 2. will clearly demonstrate the method of drafting, to be observed, for any respective weave in question, in order to produce a sensible drawing-in draft.



In 1770 there were 5,521 bags of cotton imported into England from the West Indies and 10 from the American Colonies.

CORRESPONDENCE AND NOTES

Upon Textile Topics at Home and Abroad.

FINISHING THIBETS.

BY FINISHER.

To the average finisher of woolen goods the handling of this particular fabric presents some problems which are seldom met with elsewhere. The distinctive feature of the finish on thibets is somewhat in the nature of a melton, but on account of the low quality of the stock which is mostly used for this fabric, the ingenuity of the finisher will be taxed severely to produce the desired result. As a general thing the stock which enters into these goods is so low that in many mills it would be considered worthless, but if the fabric is properly handled in the finishing room it will be possible to produce a cloth equal to the demands made upon it.

Formerly thibets were made mostly for ladies' goods and were used largely in the manufacture of skirts, but of late they have been used for men's wear also.

As indicated by the nature of the stock, it is apparent that these goods require more than the usual amount of care in the finishing department, and right at the beginning of the process the burling has to be attended to with quite a bit of care. Low grade goods of any description are usually found to produce considerable work for the burlers, and thibets are no exception. The burling has to be thorough to insure a smooth face and as there is little likelihood that the mending process will be employed on them, it is all the more necessary that the burling be done properly.

When the goods have been burled they should be tacked in such a way as to protect the face completely. Many think that this part of the proceeding is only so much time wasted, but be that as it may, it is certain that better results are obtained if the goods are carefully tacked than if that detail is omitted. This is one of the little things too often overlooked on low grade goods, many having the impression that it is very well on fine grades of cloth, but it is not worth while on low fabrics like these. Right here is found the chief reason why so many finishers fail to produce a really acceptable article in the thibet line. If the goods are properly tacked the fibres on the face are protected and will not wear off as easily as they would otherwise, and if tacking is resorted to on fine goods for this purpose it is evident that it will be of especial benefit on low grades where the condition of the stock causes it to wear off so much more easily in the fulling mill. By all means have the goods well tacked and thus save all the fibres on the face possible which will go to cover the threads.

After tacking the next in order is the fulling process and this operation has to be well considered in order to produce a good cloth. Of course the longer the fulling process is continued the more the goods will be subjected to wear and tear. This often produces a raw effect and, in fact, the goods often look like a worn out piece of cloth before they are even finished. Nevertheless, the goods must be well felted and this cannot be done in a hurry. Low stock is usually of slow felting quality and while it may not be much of a task to bring the goods to width and length, it is often found that it requires considerable ingenuity to bring them out well felted also. In some instances it is almost impossible to make them run long enough in the mill to produce the required amount of felt and all sorts of expedients are tried to bring about the desired result.

One of these is to scour the goods first and thus make it possible to use a nearly neutral soap in fulling. While this practice is sure to extend the time required for fulling and will produce a good felt if properly conducted, it

adds materially to the labor cost in that two dryings are needed. To avoid this the goods are sometimes extracted thoroughly and then put in the mill, but with the best extraction possible there will be from 40 to 50 per cent. of water left in the goods, and in consequence the amount of soap which the fuller is able to put on the goods will be so much less. Soap is an indispensable article in fulling, especially for low grade stock, and while some kind of a felt may be obtained that may pass for the real article, other evils are apt to follow which will more than overbalance the good results.

When fulling is done in this manner there is always more or less trouble with mill wrinkles and it seems to be impossible to overcome the difficulty entirely. If the goods are overhauled frequently during the fulling, well shaken out, opened and cooled after leaving the mill, and opened and folded in regular piles after leaving the washer and before going to the dye kettle, some of these wrinkles may be done away with, but with the utmost care they are likely to show up in the finished fabric.

To get a good felted fabric it is not always necessary to resort to scouring before fulling, for this may be obtained quite as well if the goods are fulled in the grease. In this case proper care must be taken in the making of the soap. For a good felted fabric from five to six hours should be required in the mill, and a soap must be used with sufficient body to last that length of time. If it were only a question of having the body of the soap of that nature from three to four ounces of good palm oil soap in a gallon of soft soap would be sufficient. Something more, however, is needed to get a good felt and the easiest and safest is to make the soap of better body than is actually required for the length of time the goods run in the mill. A heavy bodied soap acts as a cushion to the goods while they are running in the mill and is also a better lubricant, and by this means one of the greatest troubles, that of wear and tear, may be made considerably less. Then again the fibres that are thus saved and not worn off the goods add just so much to the closeness of the felt.

For a good fulling soap for these goods take 5 ounces of a good palm oil soap and 2 ounces of ammoniated alkali or crystal carbonate of soda to a gallon of water. Boil well for three hours after the hard soap is dissolved and before the tank is filled up. Keep the steam on till the tank is full and then shut it off and do not use the soap until it is cold. By using only two ounces of alkali to the gallon the strength of the soap is brought down to where it will start the grease in the goods, but will not have much in excess of that to hasten the fulling. As it is well known that alkali is a powerful agent in fulling it should be reduced to the limit.

The goods should be well soaped and examined after they have run ten minutes with the soap on. In making this test, and, by the way, it should never be omitted, be sure that the goods have enough soap, let them be a trifle on the wet side, for this will help to extend the time of fulling. Keep a close watch of the pieces and if there is the slightest tendency to twist, overhaul them. If this is not sufficient take them from the mill, shake them out well and run them in again tail end first. If the soap used is made by the recipe just given there should be no need for overhauling except when the goods show a tendency to twist.

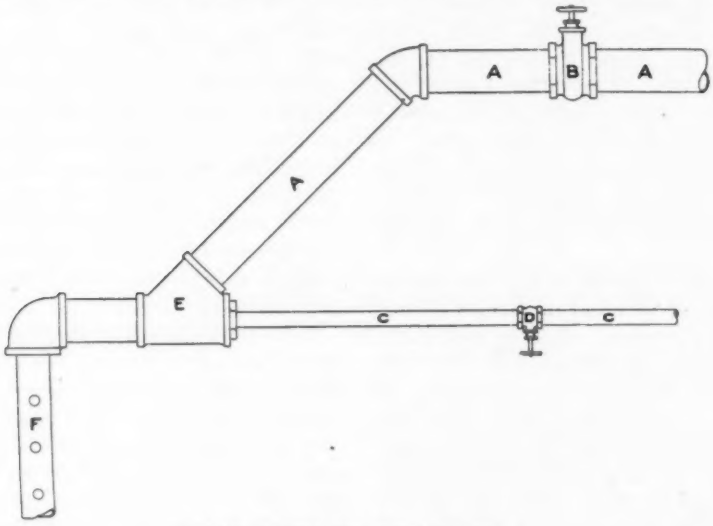
Now a few words regarding the regulation of the traps and springs. In order to do this properly the fuller should be very careful to consider his goods to see how they run and then regulate as follows: Try to have the traps on all the time while the goods are in the mill, and the weights reduced to reach this end. If the goods full faster than they should, release the pressure of the springs so they will run easier, for it must be remembered that it is not so much a question of getting goods to the right width and length, as it is to have them run the prescribed length of time in the mill. Here is where the difference between milling and fulling comes in, for these goods must not only be fulled, they must be milled or felted also. Do not try to get the fulling done in less than five hours. If possible let them run five and one-half hours and the results will not only satisfy the finisher and superintendent, but the buyer as well.

Immediately after taking the goods from the mill the tacking should be removed, the goods opened and drawn over a perch to

cool; they are then ready for the washer. At this point it is well to observe that nine finishers in every ten are sadly handicapped in this operation. Very few places have means for an adequate supply of warm water, and though finishers can be found who assert that washing can be done well with cold water, all admit that it can be done better with plenty of warm water. It makes a world of difference in the feeling of the goods when finished, and for this reason a plentiful supply of warm water should be kept at the disposal of the finisher.

This question has received the careful attention of many men, but all suggestions on this point have generally been put aside on account of the cost attending them. It may not be out of place, therefore, to bring to the notice of finishers a simple and cheap contrivance for obtaining the beneficial results attendant upon the use of warm water. The accompanying diagram almost explains itself and can be easily understood by anyone. The discharge pipe should be placed across the back of the washer and inside just below the edge of the kettle. The holes should point towards the goods so the water may be run on them as they pass down into the washer. This plan is much to be preferred to putting the pipe on the other side where the goods run up. The supply pipe should be at least 2 1/2 inches in diameter and the discharge pipe not more than 2 inches. This will cause the flow of water to be held back somewhat and makes it easier to regulate the heat. A 3/4-inch steam pipe will give sufficient steam for all purposes, a larger amount making the water too hot, which is worse than not having any hot water at all. By this arrangement an abundant supply of warm water will always be at the disposal of the finisher and will aid him materially in getting good results.

There is no special process required at the washer, the main object being to bring the goods out clean and free from soap. In order to do this in the shortest possible time the use of a good palm oil soap is recommended as it is much easier to remove than other soaps. Tallow soaps give a good lasting body, but it is difficult to get them out of the goods again.



WATER HEATER FOR CLOTH WASHER.

A, Water Pipe. *C*, Steam Pipe. *E*, Where Water and Steam Unite. *F*, Discharge into Washer.

After the goods have been properly cleaned they should be opened out, rolled tightly on wooden rolls and left there until they are wanted for the dye house. By all means regulate the work in such a manner that the goods stay on the rolls from six to eight hours. If possible it is well to let a whole day's work accumulate ahead of the dyeing, as this will insure a good long time on the rolls. Goods

treated in this manner will have a smoothness which it will be hard to obtain in any other way.

The next step is dyeing. This is not strictly a part of finishing, but in many places it has to be done by the finisher, and by the use of union dyes there is not much trouble found in this part of the work. However, here is a point which often causes much trouble in regard to wrinkles and streaks, that are frequently laid at the door of the fulling. No doubt much of this trouble is due to carelessness at the mill, but there is also little doubt that they are made worse and frequently arise at the dye kettle.

As soon as the goods come from the dye kettle they should be opened and folded in neat piles before extracting, and if possible should again be rolled up and left on the rolls a few hours before drying. This may seem like a good deal of unnecessary work, but on the assumption that an ounce of prevention is worth a pound of cure, it will be found to pay, especially when the pound of cure that may be used fails to effect a cure.

Another little point to be observed is the width of the goods when they are taken from the mill. Usually they are left wide enough so no stretching is required to bring them to the required width, but it is of decided benefit to the goods to have them receive quite a bit of stretch at the dryer and many incipient wrinkles and streaks would be avoided if this practice were followed more. If goods are to be finished 55 inches wide inside the lists they should be taken from the mill just that width and no more, then stretched on the dryer to 56 inches inside the lists. This will bring them out all right and in fact much better than if they were taken from the fulling mills in such a width as to allow for all they go in in the subsequent processes, simply to avoid stretching at the dryer. Of course undue stretching of the goods is not advisable, but when stretching gives good results it should be adopted.

After drying the usual process of shearing follows, and while this part of the work is not elaborate, it should be thorough, remembering that there should be no tendency to roughen when the goods are finished. A good hard pressing with a slight steaming completes the finishing process, after which they are measured and rolled ready for market. The result of these labors will be a strong, smooth and well felted fabric in which few would look for the quality of stock that actually entered into it.

SHRINKAGE AND STRETCH OF YARN IN TWISTING.

In the December issue of the Textile World Record appeared an article on The Size of Single and Ply Yarn, by Benedict Heim, which we translated from Leipziger Monatschrift fuer Textil-Industrie. The German writer explained the reason for the increase and shrinkage in the length of yarn when twisting two strands together, and opened up an interesting and important subject on which very little has been written. Since the appearance of this article another German writer has continued the discussion in the same journal. His article is as follows:

It is certain that the length of ply yarn is greatly influenced by the amount of twist given the yarn. The change of length is greater when the ply yarn is twisted in the same direction as the single strands. This method of twisting is used almost exclusively, however, for sewing thread, cord, etc. The strands so twisted are again doubled in the opposite direction in each case and the increase in length compensates for the previous shrinkage.

The twist of the single strands and ply yarn is in reverse proportion to the diameter of the yarn, and is, consequently, in direct proportion to the square root of the yarn number. It follows, therefore, that a certain ratio between the number of turns of twist and the yarn count will result in keeping the ply yarn the same length as the single strands. By increasing or decreasing the twist the length of the ply yarn will be decreased or increased.

The single strand of the ply yarn loses as many turns of twist in doubling as there are turns given to the ply yarn. If there is less twist in the ply yarn than in the single strands an increase in length occurs. This increase in length is lessened by an increase in the twist in the ply yarn until a stationary point is reached at which the increase of

length due to untwisting of the single strands is neutralized by the decrease of length caused by the twisting of the ply yarn. If the ply yarn is twisted still harder a shrinkage of length occurs.

In the accompanying table the size of the single strand in 2-ply yarn is found at the left hand column. In column D opposite each count is given the number of turns of twist required to keep the ply yarn the same length as the single yarn. The finer the yarn the more turns are required for this purpose.

Twist	A	B	C	D	E	F	G
	1	2	3	4	5	6	7
No 12	5,4	8,2	10,3	13,1	15,1	16,8	18,3
" 14	5,9	9,0	11,8	14,3	16,6	18,5	20,1
" 16	5,4	9,8	12,9	15,6	18,0	20,1	21,9
" 18	6,9	10,6	13,9	16,9	19,5	21,7	23,6
" 20	7,4	11,4	14,9	18,1	20,9	23,3	25,4
" 22	7,8	12,0	15,7	19,1	22,0	24,6	26,8
" 24	8,2	12,6	16,5	20,1	23,2	25,8	28,1
" 26	8,6	13,2	17,3	21,1	24,3	27,1	29,4
" 28	9,0	13,8	18,1	22,0	25,4	28,3	30,8
" 30	9,4	14,4	18,9	22,9	26,5	29,5	32,2
" 32	9,7	15,0	19,6	23,8	27,5	30,6	33,3
" 34	10,1	15,5	20,3	24,6	28,4	31,7	34,5
" 36	10,4	16,0	20,9	25,4	29,4	32,7	35,6
" 38	10,7	16,5	21,6	26,2	30,3	33,7	36,7
" 40	11,0	17,0	22,2	27,0	31,2	34,7	37,8
Change of length %	+ 2,5	+ 1,7	+ 0,8	+÷ 0,0	÷ 1,5	÷ 3,0	÷ 4,5
Hank, yards	861	854	847	840	828	815	802

In the columns C, B, and A at the left of D will be found the number of turns in softer twisted yarn and corresponding to an increase of length. In the columns E, F, and G at the right of D will be found the number of turns in harder twisted yarn. The percentage of change in length, and the length of the ply yarn corresponding to 840 yards of single yarn are given at the bottom of the table. For example, the number of turns of twist in 2-ply 24's necessary to keep the length of the single and ply yarn unchanged is found at the intersection of column D and the horizontal line opposite No. 24, and is 20.1 turns.

The plant from which the indigo of commerce is most commonly obtained is a native of the East Indies and other parts of Asia, and grown in many parts of America and Africa. It is a shrubby plant about three or four feet high and has long slender pods and narrow leaves. The dyeing substance is obtained from the leaves and stems.

CHEAP YORKSHIRE CLOTHS.

Six-quarter Tweeds, Twenty Ounces, at Thirty-two Cents.

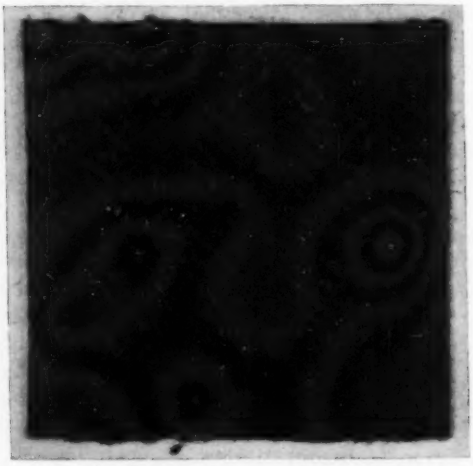
BY S. B. H.

It was my privilege the other day to be in the cloth room talking to one of our leading manufacurers, who enjoys a reputaion for making some of the cheapest tweeds that one can buy.

A bundle of patterns lay open on the table, so picking them up I said, "What are these Mr. ——?"

"A new range of patterns that we have just out, and which we think will sell readily at the price."

As they lay on the table they made a very creditable display, and they can be placed into no buyers' hand the wide world over without appealing to that man for support. They



A YORKSHIRE TWEED.

are not cloths that one would find in first-class tailors' shops on Broadway, but for a wholesale clothier doing the slopping trade, they are just the ticket, and no fear about their sale. I dare hazard the opinion that if United States ports were open that this very range of samples would sell like penny cakes in a famine, but the tariff walls of America say in effect to British manufacturers: "Keep such like cloths on your side the Atlantic, we don't want them here."

I readily grant all that an American manu-

facturer would say, but I simply set forth the cloths as an example of what some of our makers are doing, for I contend that these cloths are exceptional value.

"What's the price?" I queried,

The manufacturer answered me candidly: "Sixteen pence (32 cents) per yard, 20 ounces, 54 inches wide."

I thought the cloth marvelous value, and considering that the patterns handled remarkably sound and were sightly, I said there and then they were patterns to be proud of. At the price named I can imagine some reader saying that there cannot be much about the cloths, and that they must be plain. I say emphatically that there was not a single plain pattern in the whole bunch, and I could command at least 25 different patterns in this cloth. Those I am sending to the office of this journal are all fashionable stripes, and everyone is different in shade. A buyer could have stripes and checks, to any size he liked, and the garments when made up will look very smart, too.

They are of the cheviot order, and, of course, the material out of which they are made is rather loose and low in quality. Thick cotton twist is largely used by way of ornamentation, and it is surprising to what an extent cotton twist is being used by makers of woolen cloths of all prices and qualities.

The 4-leaf twill is the weave employed throughout, the pattern being obtained in warp and drawing arrangement. In an English mill of ordinary tweed manufacture, this weave is today being more largely used than ever it was, and as I said before with an arrangement of color and drafting after the herring-bone style, the field is unlimited for pattern production. Set coarse in the loom, a good weighty cloth can be made, and this is what has been done in this instance. The manufacturer readily supplied me with weaving particulars which are as follows: Set in the loom 22 ends per inch; 24 picks; size of warp 1 2/10 runs, which is a rather thick yarn. All the warp has a small thread of cotton twisted round to make it weave, the weft being single, that is, it has no cotton twisted round it. It is set 60 inches wide in the loom, and milled down to 54 inches. It is cut fairly near, and being pretty well steamed it has a soft, full handle.

Just a word about the materials out of which the cloth is made. I jocularly remarked, "No wool here, Mr. ——" whereon my friend replied:

"Oh, yes, just a smattering. Everything is of a loose chevioty character, and the wool used is very low crossbred, the blend containing about 8 per cent., the rest being all mungo, made from compound shades, costing 2 1/2 d. (5 cents) per lb."

With these particulars I left my friend wishing him every success with the patterns and trusting his firm would have a good winter season.

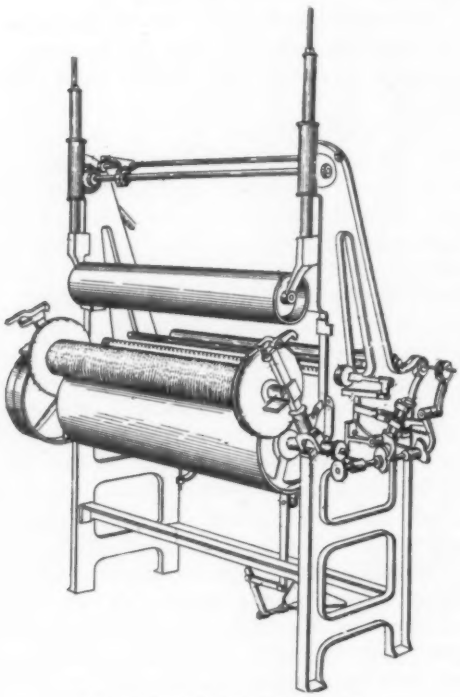
One begins to wonder what next can be made in point of novelty which is going to attract buyers of men's wear fabrics, and looking round markets here one discerns a slight departure from the everlasting stripe effects which everybody lately has worn. Scotch chevioty tweeds figure fairly prominently in next season's patterns, and as far as one can see stripe effects will be broken up by a colored crossing thread, thrown in to make a check. As a rule not more than one or two picks of colored are thrown across the piece, say every inch to inch and a half, so that while the stripe is there the overcheck introduces a little variety by giving the cloth a smarter appearance. For next winter herring-bone stripes for overcoatings will again occupy the first position, but the striping shows a tendency to become more pronounced. Dark shades still predominate, and there seems as yet little likelihood of popular taste moving off from greys, though some are going to the other extreme by wearing big checks in loud colors of a chevioty order.

(Samples of the English goods above referred to can be seen at the Boston office of this journal.—Ed.)

When Mexico was discovered by the Spaniards they found the people wearing clothes made of cotton, "as delicate and fine as those of Holland." Among the presents sent by Cortes to Charles V were mantles, waistcoats, handkerchiefs and carpets of cotton, both white and colored.

AN IMPROVED PRESSURE SPOOLER.

The spooler shown in the accompanying illustration is designed to overcome some of the difficulties connected with these machines, such, for example, as wearing of the compressor rollers. One feature of the invention comprises a compression roller having a gudgeon at each end, which are journaled in boxes secured to slides fitted to the frame, thus permitting the compression-



AN IMPROVED PRESSURE SPOOLER.

roller to revolve freely without wabbling. The compression-roller sustained in this way will be raised gradually as the spool fills with yarn, and may be retained at all times in exact working position.

Heretofore compression-rollers have been weighted upon their circumference, and it has been found that the circumference wears unevenly, thus causing the rollers to act unevenly, and the heavier the weight the greater is the wear on that class of rollers.

The boxes containing the gudgeons of the compression-roller can be lifted at any time during the process and also at the completion of winding. The pressure on the compression-roller may be increased as desired without undue wear through the addition of weights arranged at the upper ends of the slides carrying the boxes.

Another feature of invention herein contained relates to novel movable bearings for sustaining the journals of the spools on which the yarn is wound. These bearings support the spool during the winding operation and also while the operator breaks the threads before changing spools. Means are provided for throwing the pressure roll out of action while the spools are being changed.

When the machine is without a spool, the bearings occupy a low position. In this position the rests extend just far enough to permit the operator to place the journals of the spool over them and then by slightly lifting the bearings the spool-journals may be slid farther along over the rests until the journals come in line with the slots. The bearings are then dropped on the spool-journals. This done, the operator by hand winds the ends of the yarns about the body of the spool and then pushes against the spool, moving it and the guideways about the shaft until suitable locking devices carried by the upper ends of the guideways and actuated, by suitable springs, engage a projection attached to the framework.

The locking devices secure the guideways for the bearings in their operative positions throughout the winding of the yarn on the spool, and during this operation the bearings slide upwardly on the guideways until the spool is full.

When a spool is to be removed the operator will depress the outer ends of the locking devices and disengage them from the projections and then by pulling outwardly on the spool turn the guideways forward. In this position the operator has free access to the yarn between the traverse-guide and the spool to cut the yarn preparatory to removing the wound spool. After the cut ends have been caught together in usual manner the operator lifts one bearing after the other and disengages the slots from the journals of the spool, letting the journals pass over the rests and finally leave the machine. This opera-

tion greatly lessens the labor of the operator, who has heretofore commonly supported the spool by one knee while severing the threads and getting ready to move a wound spool.

The vibration of the thread guide can be adjusted while the machine is in operation, and it is claimed that this is the first machine in which such adjustment is possible.

DRYING YARN AND CLOTH.

In the drying machine shown in the accompanying drawings, the material is subjected simultaneously to a steaming and drying process at a high temperature and the inventor claims that the colors are both fixed and brightened by the process.

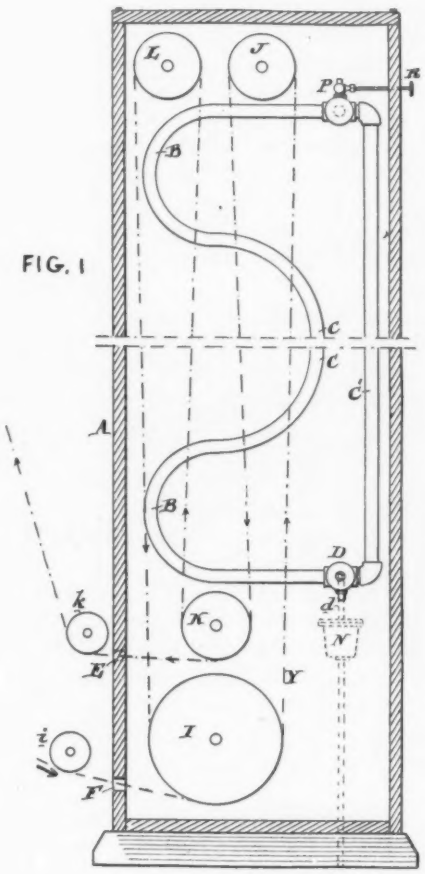
A closed chamber is provided with steam coils, pipes, or cells, into which steam at high pressure is passed. The chamber is provided with transverse guide-rollers at top and bottom, about which the yarn or textile material is guided, so as to pass and repass across the chamber before it emerges. It is thus retained within the chamber and acted upon by the heat from the steam-coils until it becomes substantially dry, the process being carried on in a bath of steam which fills the chamber. The yarn or other textile material is fed into the chamber through an aperture near its bottom, and is withdrawn through an aperture near the bottom, so that no steam can escape from the upper or effective part of the chamber.

The dyed yarn or cloth is passed through an atmosphere of steam while being subjected to a high temperature of radiant heat, which has the effect of expelling the excess of moisture in the dye solution contained in the material under treatment while drying out the material under high temperature in a bath of steam. The compartment in which this process is carried on is kept supplied with steam provided by vaporizing the moisture carried in with the textile material. After first filling the chamber or compartment with steam no further supply of steam is necessary, the same being insured by the employment of the high temperature from radiant heat used to develop, brighten, and fix the color.

Fig. 1 is a sectional side elevation of the drying-machine. Fig. 2 is a front elevation, and Fig. 3 is a sectional plan view.

A is the closed chamber, being preferably of much greater height than width or depth. Within this chamber are the heating-coils, which consist of manifolds, D G, near bottom and top, connected by a series of heating-pipes, B C, and C', the former being preferably made with the forward projecting bends, B B. Steam is supplied to the upper mani-

FIG. 1



fold, G, of the coils by a steam-pipe, H, having a suitable regulating-valve. A small valve, P, operated by a handle, R, extending outside the chamber, permits escape of steam from the coils into the chamber to fill it with steam in the first instance.

The lower manifold, D, is supplied with a drain or drip pipe, d, for water of condensa-

tion, which is conveyed to a suitable steam-trap, N.

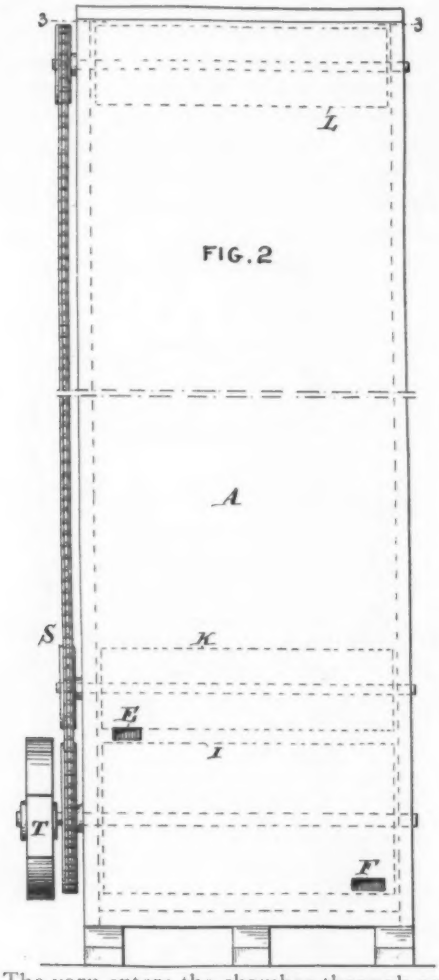


FIG. 2

The yarn enters the chamber through aperture, F, close to the bottom, and is received by a roller, I, under which it passes. This yarn is then guided upward and about a roller, J, at the top of the chamber, thence downward and around a smaller roller, K, near the bottom of the chamber, thence upward and over a second roller, k, at the top of the chamber, then downward under and around the lower roller, I, and so on, until said rollers are filled. The yarn finally leaves the under part of the roller, K, and passes out of the chamber, A, through an aperture, E, near the bottom. The yarn is then guided about a roller, L, upward and through delivery-rollers, into a suitable receptacle.

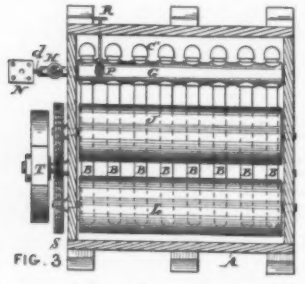


FIG. 3

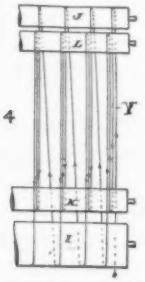


FIG. 4

SPUN SILK AND CHAPPE.

BY A. CORADI.

To define these two terms it is necessary to describe the process of manufacture as well as the raw materials that enter into the manufacture of these yarns.

A great deal of the confusion that exists about these two terms comes from the fact that the distinction is only made in the English language. In French both are called "schappe" or "chappe;" in German both are understood as either "floretseide" or "schappe" according to local custom. As a matter of fact both spun silk and chappe are made from the raw silk waste materials which cannot be worked up into regular reeled silk.

Silk is divided into two divisions:

First: The waste gathered in the regular process of reeling and spinning the raw silk; this subsequently furnishes the material for what is called "chappe" in English.

Second: The material obtained from cocoons, which for one reason or another are not fit to be reeled. From these spun silk is made.

In the first division we have the following:

The loose fibres around the cocoon on which the latter is suspended on the branches. This is called "spellaya" or "blaze." On account of the unavoidable foreign substances such as wood splinters, etc., this is one of the poorest materials and its output inconsiderable.

The most generally used material in this class comes from the waste made in the process of reeling called in Italian "strusa,"

in French "frison," in Japanese "noshi." It consists of the outside of the cocoons. The reeler takes 30 to 40 cocoons at a time, and puts them in the basin filled with hot water, gathers up the ends with a brush and unravels the cocoons until all the ends run off together. Then begins the regular reeling of the silk. The hank obtained from the outside of the cocoon is cut off, brushed out carefully and then dried in the air. What finally rests on the brush is kept separate as a poorer grade and is called "bourette."

The value of the "strusa" or "frison" materials varies greatly not only according to the grade of cocoons they are obtained from, but to a large extent according to the care and skill displayed in the making up of same.

Another material in this category consists of the innermost layer of the cocoon where the fibre is very thin. It has to be boiled and washed to free it from the chrysalis. It is a less valuable grade and is called in Italian "ricotto," in French "estrasse."

The purest and most valuable waste is obtained from the next process after the reeling where the raw silk is wound from the skeins on bobbins. This is the winding waste, in Italian called "strazza," and in French "bourre de Devidage."

The waste gathered from the regular spinning process furnishes a much less valuable product as twisted threads can never be properly separated in the subsequent process of combing and carding.

In the second division of the waste material (cocoons), we have the following:

First that large quantity of pierced cocoons (French "cocons perces"). These consist of the cocoons set aside for breeding purposes. Instead of killing the chrysalis when the cocoon is completed, they are left to the natural metamorphosis of the worm into a butterfly. When the time of the second transformation has arrived, a brownish fluid is exuded. This fluid helps the butterfly to soften the inside skin of the cocoon and, working with head and feet, he finally manages to bore a hole through the cocoon, through which he escapes; all these cocoons are unfit for reeling and come into the market as material for the waste silk spinners.

Among the damaged cocoons we also have to consider the so-called "cocons piques." These are the cocoons in which a parasite insect develops and devours the chrysalis of the silk worm, transforms itself into a chrysalis and later into a fly, in which state it pierces the cocoon and escapes. This parasite is found in all silk growing countries, but does the most devastation in Japan, where it is known under the name of "ouji." These cocoons bring a good price in the market, as the cocoon in itself is not more damaged than the pierced cocoons. Of much less value is the material gained from such cocoons in which the chrysalis does not survive the transformation into a butterfly on account of sickness or weakness.

The characteristic distinction between the two divisions of waste material thus described which are indicated by the English term of "chappe" for the one and spun silk for the other is found principally in the different methods of preparation for the spinning process.

From the "strusa" or "frison" material the net silk fibre is gained through a process of fermentation. The hanks are soaked in lukewarm water from 6 to 10 days, thus decomposing the gum and then the silk is carefully washed in clear water. From this we get the English "chappe." Its fibre is shorter, its appearance more hairy, and harsher to the touch. It is used for cheaper articles.

The cocoons, on the other hand, are first thoroughly boiled, then washed with soda or other chemical solutions, then torn to shreds by machine. On account of the boiling process the yarn from this material feels softer, its fibre is longer and stronger and is used for better grades and finer numbers of yarn.

The processes of combing, carding and spinning are the same for both chappe and spun silks, similar to the manufacture of worsted yarn.

The short waste (card waste) that remains in the carding machines is again spun similar to carded wool and come under the category of "bourette." This is the cheapest silk waste material and is used principally for bed covers and traveling blankets.

There is no specific test to distinguish spun

silk from chappe. As stated before, spun silk (the material gained from cocoons) is boiled, chemically washed and cleaned then dried in the air and thus bleached. By these processes its touch becomes soft, its color lustrous and in general appearance it looks like a silk dyed in a light cream shade.

Chappe (the material obtained from waste) is not boiled, its gum being decomposed through fermentation, therefore when it appears in commerce its color is not as clear and lustrous, and on account of the shorter fibre it is used for cheaper articles.

Bourette, being a waste material obtained in process of manufacture and being of very short fibre only fit for coarse, cheap yarns, comes under the term of chappe. Its production is inconsiderable.

Single waste silk yarn is numbered by the cotton system, the count indicating the number of 840-yard hanks per pound. Thus 1/30s yarn measures 25,200 (840 × 30) yards per pound.

In numbering ply waste yarn the count likewise indicates the number of 840-yard hanks per pound. Thus 2/30s yarn measures 25,200 (840 × 30) yards per pound. To obtain this length the single strand must measure (840 × 60) 50,400 yards per pound the single count being 60's. The count of silk waste yarn thus refers to the length in 840-yard hanks per pound of the completed thread, regardless of the number of strands.

The count of cotton yarn, on the other hand, indicates the number of 840-yard hanks in a pound of the single strand. Thus 1/30s cotton measures (840 × 30) 25,200 yards per pound. In 2/30s cotton the single strand measures (840 × 30) 25,200 yards per pound, and the 2-ply yarn will, consequently, measure (840 × 30 ÷ 2) 12,600 yards per pound.

In 1801 there were 520 million pounds of cotton grown in various parts of the world; in 1901 there were 7,250 million pounds.

The bleaching process as performed in the middle of the eighteenth century, lasted from six to eight months. It consisted of successive operations of steeping, bucking and crofting, each of which required several weeks.

ENGLISH NOTES.

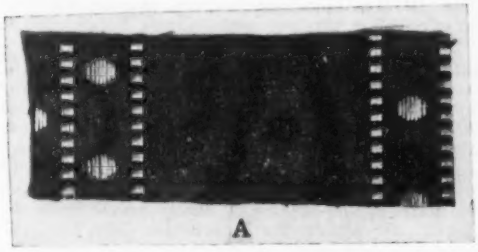
(From our Special Correspondent.)

The high prices of wools in Bradford show no signs of a decline. Holders feel strong enough to turn a deaf ear to the stories of the unhappy manufacturers who positively can not, in yarn or pieces, get orders at a living profit. Buyers of goods and sellers of wool are grinding out the life of the wool worker. With those who use shoddy the case is not the same. The unwarranted rates for the new wool are helping those who use shoddy and waste products, and helping to minimize also the effect of dear cotton. Woolen serges present the advantage over the worsted fabrics that the prudent buyer is always looking for. In all conditions of trade it is easy for the user of low material to reduce the cost of his cloth without affecting the quality materially.

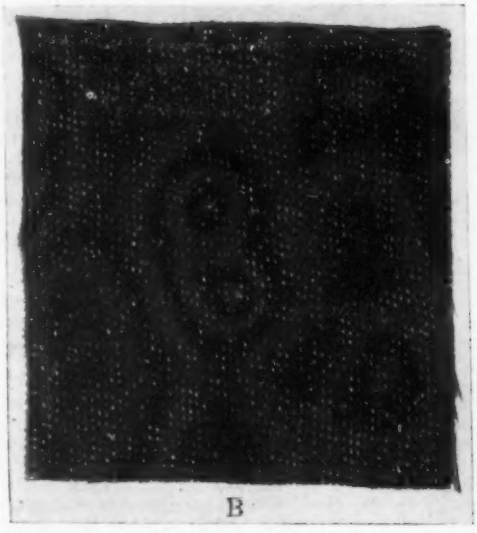
High prices for merino are undermining its old position as the great indispensable of Yorkshire linings. Mercerized cotton is encroaching on its preserves and is stealing merino orders as certainly as it is hurting the sale of silk. Finishing has received a great amount of attention at the hands of specialists the last few years. Wonders of all kinds have been performed by running dyed cotton through heavy bowls, treating them with dry steam and enormous pressure. Now the specialists feel that they have brought the mercerized Italian or sateen very close to its Botany-filled prototype in touch and look, of course at a much lower price. Exactly how it is being done nobody is anxious to tell for the knowledge is a valuable asset. Before long we shall see the mercerized lining boomed by advertisement and otherwise with a new vigor. Clamminess, due to the hygroscopic action of caustic soda in the cotton, was the feature that stood in the way of the earlier cotton linings. The cold feeling promises to be a thing of the past.

The stiffening and finishing of cottons and silks according to French methods is now being done in Bradford. Cotton moreens with or without some such geometric design and stripe as shown in pattern A are being dealt with skillfully. A black dot alternates with a white one in the design and white bars with

black ones in the stripe. The warp spotting is of mercerized cotton, loose at the back. For other grounds the warp colors are varied. The finish is almost the whole of the business. To water the fabric and so produce the moire markings, and at the same time to turn it out looking smart and feeling full of body is the achievement that lends



A



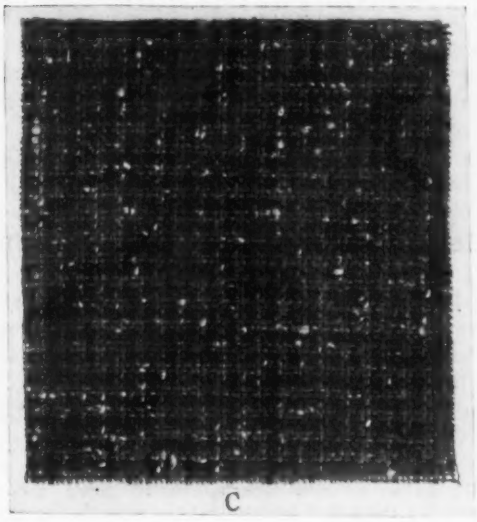
B

everything to the stuff. In 29/30 inches the cost is about 20 cents and while new the fabric looks to be worth far more than its value. For export to hot countries and for the ready-made trade the article has had a considerable run.

Apropos of watering, a Bradford manufacturer is using a device of his own invention to form a moire pattern by weaving and subsequent calendering. The warp passes over a roller of uneven diameter, causing certain ends to be under greater tension than others. The effect on the picking is to make it densest where the warp is tightest and to produce a waviness whose pattern is determined by the blocks used on the circumference of the loom roller. In calendering the pieces are laid face to face, their denser portion crossing each other. Thus a moire effect is given to cheap cotton or silk and cotton skirtings of the moriette family.

The desire for a smart yet unobtrusive break in relatively plain dress goods has led to some cheap and taking productions from cross-bred. The cloth B, for example, is a simple twill with every fourth end in colored and white twist. To enliven the monotony the twist is dropped behind to form bright spots of self-color upon the face at one inch intervals in the width and two inches in the length. In a full dress weight the price is 34 cents. The round flat spot is a welcome relief after the ubiquitous slub of mohair. Advantage of the taste for voiles has been taken to produce cheap goods of very open texture.

Goods such as pattern C, counting 32 by



C

32 per inch, in which two threads of plain colors alternate in both directions with two threads of fancy noil are made at 18 cents in dress width. Being of sound if coarse material they retain shape and a trace of smartness far longer than would warmer cloth from shoddy.

Though pure greys, known as King Edward's, are the most fashionable in fine goods

for men, good tailors are selling blue greys of which the dark is almost indigo and the light almost sky in color. Neat, broken effects with large but not conspicuous overchecks are popular. The feature common to all is their blend of line stripe, check and flake, which mingle confusedly leaving no character predominant. Gradually, it is thought, the check will assert itself as master in forthcoming patterns.

The soft hues of the Harris tweed are the undisputed chiefs among overcoatings. Sandy yellow tones with blues and greens gently contrasted in the checks are first favorites. Cloth caps and helmets of the same are selling well. The odor of the original cloth is imitated with moderate success at Galashiels. To duplicate the strong odor of Harris tweed from Harris the wool must be dressed with fish oil in addition to being exposed to the smoke of peat fires. The Harris smell is a compound of wool fat joined to the other two named. As with the colors the scent needs toning down from its first acrid pungency. Many chemical expedients to counterfeit the simon-pure article have confessedly failed in the West of England. To the uninitiated the smell is more convincing and desirable than the cloth itself. It is the tweed's message to the nose that proclaims to all beholders the quality and style of the garment.

IMITATING AMERICAN COTTON GOODS

In a recent report to the State Department, the U. S. consul at Beirut, included the following extract from a local journal, which gave an interesting account of trade customs among the uncivilized or semi-civilized inhabitants of Africa.

During Lord Cromer's recent trip on the upper Nile he wrote from Gondokoro to Lord Lansdowne stating that he had noticed that all the cotton goods exposed for sale at Gondokoro came from the United States. Lord Cromer added: "I learned on inquiry that the natives greatly preferred American to British made goods. They complained of the quality of the latter, which, it appears, contains a great deal of what is called 'dressing.' Sir Reginald Wingate informs me that Abyssinia is entirely supplied with cottons from the United States. Up to the present time England supplies the Soudan, but when the natives become acquainted with the United States cotton goods, as will presumably be the case before long, it is not improbable that, under present conditions, this market will also be lost to British trade. The matter is one which would appear to merit the attention of British cotton spinners." As these remarks were of considerable importance we instituted some investigations on the subject and the following results of our inquiries may be of interest. Many years ago a certain quality of gray long cloth, or gray shirting, was imported into Egypt from the United States. It adapted itself admirably to the Egyptian process of dyeing and was thus re-exported to Candia, Beirut, and other Mediterranean ports. It also found its way into the Soudan, and being of stout texture, without any finish (which, by the way, the Soudanese prefer to the bleached), it gained favor, was successfully introduced, and was thenceforward known as "American" and "Americani." Some Manchester firms, having had their attention drawn to this particular trade, soon followed suit with a similar and, as we understand, a somewhat superior article and, what was most important, at a cheaper price than the original American make, which latter was finally ousted from the market. Since then the Manchester cloth has been exclusively imported. With their usual conservatism, however, the natives still call it "Americani," as signifying the article's quality, but not its origin, of which they have but little notion at best.

There is a precisely similar instance extant even now in Egypt. A number of years ago a local firm of importers, Messrs. Peel & Co., introduced into Egypt a white calico that was much appreciated and has ever since retained their name. The native is only satisfied as to what he is buying when it is pointed out to him that it is "Peel" or "Beel," which it does not follow it always is. As a matter of fact, about two years ago a merchant at Omdurman imported a small parcel of genuine Americani, but the transaction resulted in pecuniary loss and was not so satisfactory as the English Americani. Our inquiries tend to show that when the native speaks of Americani he expresses the distinguishing quality of the article and not the origin. If there is an immediate competitor in view for piece goods it is the Italian make, some of which during the last two years has been imported into the Soudan under English names and with imitation trade-marks. This has been imported hitherto principally by Assiout merchants, who can obtain these goods on six months' credit. They sell the goods in the Soudan and speculate in Soudanese produce, such as gum, and so, within the term of their credit, turn the money several times over. A notable feature in the Soudan business is the credit system, which is daily becoming more accentuated, and as Italian makers are prepared to grant extensive credits, where Manchester demands ready cash against documents, there is a probability that, as a consequence of such facilities, Italian cloth may in time obtain a footing and become a potent rival to the Manchester trade.

The cotton goods mentioned come almost exclusively from Manchester, the silk handkerchiefs from Baghdad and Syria, the sugar from France, and the enameled ware from Austria-Hungary.

Questions and Answers.

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD RECORD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

For reply to questions that are not of general interest to readers of textile journals, such as those relating to the composition of yarns, analysis of fabrics, etc., we will charge the enquirer with the cost of the investigation.

Felt Hardening Machine.

Editor Textile World Record:

Can you give us the name of a firm building a hardening machine for felt?

Eastern (403).

Hardening machines for felt are built by the Farrell Foundry & Machine Co., Ansonia, Conn.

Labeling Thread in New York State.

Editor Textile World Record:

What regulations have been made recently by the state of New York regarding the labeling of thread offered for sale? Rip Van Winkle (423.)

An act providing for the labeling of cotton, linen and silk thread became a law in New York by the approval of the governor on May 15, 1903, and went into effect on January 1, 1904. It is as follows

§ 42. Thread of cotton, linen and silk to be correctly labeled and stamped.—Every person, firm or corporation engaged in the manufacture of sewing, darning, crochet, or embroidery thread of cotton, linen or silk, or in putting up such thread on spools or in balls, skeins, tubes, bobbins, cones, or other packages, shall before the same is offered for sale, affix to, or impress upon each spool, ball, skein, tube, bobbin, cone or other package of thread so manufactured or put up, a label or stamp designating its weight in pounds and ounces or length in yards; provided, that where from the shape or size of the package it is impossible so to affix such label or stamp, the same shall be affixed to the box in which such packages are put up. If any such person, firm or corporation shall neglect to affix to, or impress upon, any such spool, ball, skein, tube, bobbin, cone, package or box such label or stamp, or shall, with intent to deceive, affix to, or impress upon, any such spool, ball, skein, tube, bobbin, cone, package or box a label or stamp specifying that it contains a number of yards or a quantity of thread greater by five per centum or more than it does in fact contain, then such person, firm or corporation shall forfeit the sum of twenty dollars for each spool, ball, skein, tube, bobbin, cone, package or box, which, without such label or stamp, or falsely so labeled or stamped, shall be sold, or be delivered to any person to be sold, said sum of twenty dollars for each violation of this section to be recovered in an action or actions by any person, firm or corporation who will sue for the same, one-half whereof shall be paid to the state treasurer.

§ 43. Penalty for selling such thread incorrectly stamped.— Any person, firm or corporation which shall knowingly sell sewing, darning, crochet or embroidery thread of cotton, linen or silk either without a label or stamp specifying the quantity or length thereof, or with a label and stamp falsely stating such quantity or length, shall forfeit the sum of twenty dollars for each spool, ball, skein, tube, bobbin, cone, package or box so sold without label or incorrectly labeled, said sum of twenty dollars for each violation of this section to be recovered in an action or actions by any person, firm or corporation who will sue for the same, one-half whereof shall be paid to the state treasurer.

Cotton Mills in Mexico.

Editor Textile World Record:

Can you tell me where I can get information about the cotton mills in Mexico, and something about the extent of the interests there?

Aztec (410.)

Detailed information about the cotton mills in Mexico is difficult to obtain. From the last available reports to the government, there are approximately 125 cotton mills, containing about 554,880 spindles and 17,725 looms.

Marking Woolen Cuts.

Editor Textile World Record:

We are making woolen and worsted cassimeres and have difficulty in deciphering the numbers on the cuts after the pieces are finished. What is the best method of marking cuts?

Odd Number (421.)

The piece number, loom number, yards and ounces per yard should be sewed on the tail end of the piece with yarn that will when finished be enough different from the piece in color to enable the figures to be easily read. Cotton yarn is usually used as it is not colored in dyeing the wool. Much depends on the manner in which the numbers are sewed on the cloth. Experience and a natural aptitude are required for this work. The figures should be plain and as small as possible so as not to waste cloth.

In most woolen mills the pieces are numbered in either the warping or weaving room. This num-

ber is sewed on the end of the woven cut and finally marked on the ticket when the piece is finished, providing it can be read on the cut. Frequently the number is either torn off or rendered illegible by rough usage in finishing. In such case a new number is given to the piece, with the resulting risk of having duplicate piece numbers.

An excellent method consists in so numbering the pieces in the warping room that the first cut number of each warp will end with 1. In this way the final figure in the number of the piece indicates the number of pieces woven from the same warp. For example, the pieces in four warps of 5, 7, 8 and 9 cuts respectively, will be numbered as follows:

Warp No. 1	Nos. 1 to 5
Warp No. 2	11 to 17
Warp No. 3	21 to 28
Warp No. 4	31 to 39

The object in so numbering the woven cuts is to enable the operatives to know at once how many cuts have been woven before the one under observation. If, for instance, a wrong draw is found in a cut numbered 23, it is probable that the same imperfection will be found in one or more of the succeeding cuts of the warp, which are numbered from 24 to 28. Cases are constantly arising in the finishing department in which this method of numbering the cuts proves of great value in tracing defects. It is specially adapted for woolen and worsted mills in which the number of cuts in one warp does not usually exceed 10.

Instead of retaining the old cut numbers, the finished pieces are numbered consecutively as they are measured and booked in the finishing room. The old or woven cut number is also booked to enable the piece to be traced back into the mill if necessary, but the new or finished piece number is the only one marked on the cloth ticket.

Efficiency of Looms.

Editor Textile World Record:

How is the percentage of production calculated for a weave room? High Speed (418.)

Owing to the unavoidable loss of time caused by stopping the loom to mend broken threads, change shuttles and warps etc., the actual production of a loom is always less than it would have been if the looms ran without interruption. If the efficiency of a weave room is 70 per cent. it follows that the looms have been idle or not engaged in cloth production for 30 per cent. of the time. This percentage is calculated by dividing the number of picks in the cloth actually woven by the number of picks the looms would take if running constantly.

Example: Fifty looms run 90 picks per minute for 58 hours producing 6,700 yards of cloth having 52 picks per inch.

50 (looms) × 90 (picks per minute) × 3,480 (minutes per week) equal 15,660,000, picks per week (theoretically).

6,700 (yards) × 36 (inches per yard) ×52 (picks per inch) equal 12,542,400, picks per week (actually).

12,542,400 ÷ 15,660,000 = 80 1/10 per cent.

This calculation can be simplified by using a constant number in place of the four constant factors, number of looms, picks per minute, minutes per week, and inches per yard. In the above calculation the product of the first three is divided by the fourth, thus: (50 × 90 × 3,480) ÷ 36 = 435,000, constant. The efficiency is calculated by this constant as follows:

6,700 (yards) × 52 (picks per inch) ÷ 435,000 (constant) = 80 1/10 per cent, efficiency of looms per week.

When the cuts vary but slightly in length the average picks for any given time can be found by adding the number of picks per inch in each cut and dividing the total by the number of cuts.

The record of production is usually kept in the weave room in such form that this method involves very little labor. The constant number remains unchanged as long as the number of looms, speed and running time are constant. Having this constant number a weave room overseer can calculate the percentage of efficiency in a few minutes. This is an invaluable means of determining the efficiency of a weave room and should be used in every weaving mill.

Spun and Chappe Silk.

Editor Textile World Record:

Please define the difference between spun and chappe silk yarn and give a method of determining one from the other. Tokio (422.)

Answers to the above questions will be found in an article in another part of this issue.

Labor Cost of Cotton Goods.

Editor Textile World Record:

One of the lines in your cotton chart indicates the labor cost per pound of cotton cloth. What items are included in this cost? Do you include fuel, repairs, salaries and insurance?

Marathon (425.)

The labor cost indicated by our chart includes only the pay roll and salaries; fuel, repairs, interest and insurance are not included.

KNITTING DEPARTMENT.

For Knitting Mill Machinery, Equipment and Supplies, see pages 232 to 253. Also Buyers' Index.

KNIT GOODS SITUATION.

The greater part of the summer underwear business, at first hands, has now been delivered, and those manufacturers who make heavy weights have turned their machinery on to fall orders.

A shortage still exists in ladies' low priced ribbed vests running from 65c. to $1.00, and also in men's balbriggans to retail at 25c. and 50c., and nearly every jobber has orders still on his books for these goods that should have been shipped long ago. No stock lots are being offered, and any seconds that come into the market are being taken as quickly as offered, which goes to show that stocks are light, and with the continuation of the good weather conditions accumulation is not looked for. The weather in April was not propitious for summer underwear, but the demand at the present time is good, and the indications are that a satisfactory business for the season will be transacted.

Manufacturers in all lines of medium grades of underwear for fall have all the business on their books that they care to take under the present raw material conditions. It is not that they have enough business to keep their mills running for the year, but they can see no profit ahead in paying present prices for yarn and cotton, and selling their goods at prices buyers are willing to pay.

Of late there has been considerable call for men's fleeced goods, but buyers' ideas were for goods at from $3.50 to $3.75, while manufacturers were asking $3.87 1/2 to $4.00, and little business was contracted.

It is certain that several jobbers have disposed of their original purchases, and are now open to buy goods at the first sign of weakening prices displayed by the makers. So far there has been no weakness shown by manufacturers of fleeced goods, and the only instance of any weakness whatever was shown by a New York State manufacturer who recently offered some ladies' 6-lb. ribbed goods at $2.05 for "firsts," or $2.00 for the "run of the mill". This was probably a stock lot of yarn and should not be seriously taken as a criterion on the condition of the trade.

Jobbers state that they have noticed an increased demand this season for white ribbed goods for ladies and children. The ladies' bleached goods made on the fine stitch are selling extremely well, both in separate garments and in combination suits, while the children's bleached goods, both in straight and shaped, have been in good demand.

A large number of orders have been placed for knit corset covers for fall, the principal demand being for those made with the circular front pieces which give the extra bust room. These are made in different weights to retail at 50c., also in worsted to retail at $1.00, in fine and tuck stitches.

AN INFANT'S WRAPPER.

Manufacturers of infants' wrappers have noticed the increased demand for a buttonless wrapper for infants, and as a consequence a new garment has recently made its appearance. We present herewith an illustration of it.

Manufacturers claim to have booked some large orders for this garment, although it has been shown only a very short time. They claim this is an improvement on the one already in the market made with straps to be pinned at the back, the argument being that with the new garment it is not necessary to turn the child over in order to fasten it.

Another new feature in knit goods is an improvement on the child's waist recently in-

A CHILD'S WAIST.

troduced. It consists of a pin tube attached to the tape at the sides to fasten the garter to, as shown in the accompanying illustration.

This little device holds the safety pin of the garter rigid, and is quite an improvement on the eyelets heretofore used. It was patented by a notion buyer in a western jobbing house, and has already been adopted by several waist concerns, and also by one corset manufacturer.

HOSIERY.

Considerable activity is noted in the hosiery departments on account of the great demand for tan hosiery. Dealers placed orders very sparingly on this color, and as a consequence no one has any great quantity to meet the heavy demand.

Domestic manufacturers are offering regular made gauze lisles in tan to sell at 25c. which are being taken up rapidly. A good trade is also being done on domestic extracted goods, principally on pin dots.

That people are prosperous and have money to spend is evident from the increased business being done on all lines of silk hosiery, and this branch of the business is well taken care of by our domestic manufacturers.

SWEATERS, BLOUSES AND SHAWLS.

An excellent business is being recorded every day on these lines. Prices continue very firm, and now it is not a question of price between buyer and seller so much as it one of assortment and ability to deliver.

A good demand is observed for men's and boys' sweaters in plain colors, and in ladies' blouses in quiet colors, and in wool and silk shawls. This demand will probably increase as the time draws near for summer outings.

A new design shown in a ladies' blouse is a fancy stitch light weight garment in solid colors, made with a turnover stock collar, with lapels trimmed with two rows of silk braid to match the color of the garment, and with gold plated buttons on both sides of the lapels. These are taken usually on account of their being less bulky than the blouse shown so extensively for the past two years.

CHEMNITZ REPORT.

Trade in the hosiery business is at present rather dull, but it is expected that it will improve in a very short time for the reason that a number of leading buyers are already in town and others are expected shortly.

Orders have come in rather sparingly for the past few weeks, and in some mills work is becoming scarce. Prices have not been affected, however, as the price of yarn is still advancing, and the indications are that they will not come down much this year.

Manufacturers find it hard to get certain numbers on short notice, and delays are often caused by the fact that the maker has to wait for weeks before he has material to commence on the orders due.

Large stock orders have not been placed

this season as in former years, but it is expected that buyers will place them liberally now, as indications are that higher prices will prevail, and later in the season certain grades will be hard to get within a reasonable time. Those buyers who delay placing their orders until late in the summer will experience the same delay which has occurred during the past year's business.

The market in lace hose is firmer than it has been for some time, and higher prices are asked for the stock lots which are still in the market than were asked six weeks ago, and for goods made to order prices are firm and no concessions are made.

The demand for special patterns at the $2.00 limit is larger than for goods at the $1.50 limit.

It is not yet clear what will be the most popular in fancy hose. Stripes are slow, but embroidered effects have been taken again on a large scale by some of the leading houses.

In split foot goods stocks are growing smaller, and for new orders only the lighter weight goods can be offered, as manufacturers cannot produce the old goods any longer at the popular prices, regardless of the fact that wages are lower than they were last season.

Fine gauze weights in staple goods are still taken very extensively, and promise to be the leading article for next season. It is noticed, however, that they are generally bought without the spliced selvage and without the high spliced heel, owing to the fact that these reinforcements show too plainly when worn with low shoes.

Glove manufacturers are still busy on their spring orders, having received many duplicates on lisles and silks. The fall season has not opened up as well as it was expected to.

In knit gloves larger orders have been placed than last year, but not enough to give work to all the machines that were set up two years ago when they were in such great demand.

Orders for cashmerettes and woolen gloves with lining are smaller than last season, but it may be that these will come a little later, as has happened in some seasons heretofore when the large orders came rather late in the season, as importers wanted to make sure what would sell before they bought extensively.

Prices on all gloves are firm, wages are high, and good hands are scarce, so that a falling off in prices is not expected at the present time.

Fig. 1.

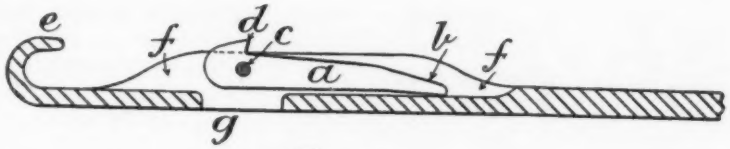


Fig. 2.

A KNITTING MACHINE NEEDLE.

An improvement in latch needles has recently been patented and is designed to prevent the loop from being knocked over the needle head before the new loop is formed.

Fig. 1 is a plan of the improved needle. Fig. 2 is a section on the line A A, Fig. 1; and Figs. 3, 4, and 5 are diagrams illustrating the action during knitting.

The needle-latch, a, which is pivoted between the sides of the needle at (c) and has a spoon end, b, for covering the point of the hook, e, is provided with a projection or nose, d d, which projects above the sides of the needle, as shown in Fig. 2, when the latch is open. The sides of the needle form a recess,

f, which is large enough to contain the whole of the latch except the projection or nose, d, and it is therefore impossible for the old loop to pass under the spoon end, b, of the latch, as in an ordinary needle. At the bottom of the recess, f, and under the pivot, c, there is an opening, g, to receive the projection, d, when the latch is closed, and the parts are so proportioned that no part of the latch ever projects beyond the back of the needle.

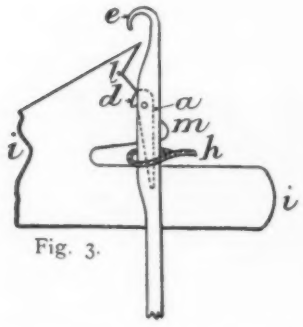


Fig. 3.

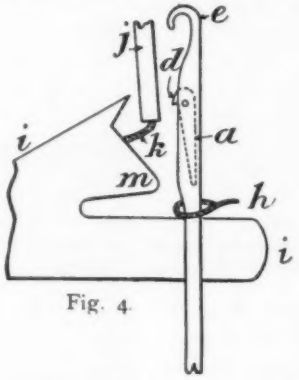


Fig. 4.

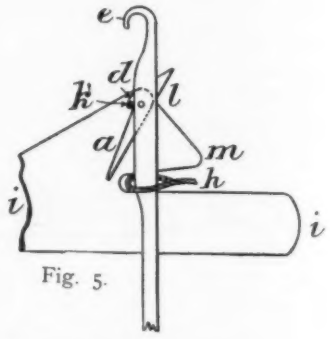


Fig. 5.

The action of the needle is illustrated in Figs. 3, 4, and 5, which show also a form of sinker adapted for use with the improved needle. In Fig. 3 the needle is shown in its normal position, with the old loop, h, round the latch, a. When the needle reaches the knitting-cam, it rises until the latch is clear of the loop, h, which is held down by the lower neb of the sinker, i. The sinker is then withdrawn to permit of the thread-carrier, j, laying the thread, k, for the new loop, this thread being laid below the latch-pivot, as shown in Fig. 4, instead of above it, as with an ordinary needle.

The sinker, i, is then moved forward, and the upper neb, l, draws the loop. At the same time the needle descends, and the newly-drawn loop, coming into contact with the projection, d, opens the latch to permit the old loop, h, passing under it, as shown in Fig. 5. The sinker, i. is then withdrawn to allow the loop, h, to pass the sinker-nose, m, as the needle descends to its knocking-over position, after which the sinker returns to the position shown in Fig. 3 and holds down the work as the needle rises to its normal position.

When a thread breaks or from any other cause is not fed to the needle for the new loop and the needle descends to its knocking-over position, the old loop passes over the latch into the needle-hook instead of under the latch and over the hook, as with an ordinary needle.

BLEACH HOUSE TOPICS.

BY PALMETTO.

KNIT GOODS.

We will assume that the purpose and aim of bleaching operations in general, is to obtain the maximum degree of whiteness, with the minimum loss of strength of the fibre. This applies particularly to the bleaching of cotton goods; there are other important and very essential conditions required, especially in the knit goods trade, for instance, the preservation of the elasticity which the material possesses in the unbleached state, and the elimination of the very objectionable harsh condition, so common to knit goods that have been bleached.

To obtain these ideal results, we will assume is the desire and aim of every intelligent and conscientious "young bleacher." Let us briefly consider what the chief factors are that contribute to this high standard of results. We attach great importance to the boiling of the goods in the kier, for if this operation is not carried out in a manner that will effectually dissolve the wax and pectic substances of the cotton fibre, no amount of after treatment will produce entirely satisfactory results. There exists among bleachers a great difference of opinion as to the length

of time that the kier boil ought to be continued. On general principles, we should say, that the least time in which the complete dissolution of the impurities of the cotton can be effected, is of course the right amount, thus effecting an economy of steam, but as different grades of cotton vary considerably in character, it can be determined only by practical experience and observation just how long the boiling period should be continued. We should advise not less than six hours in any case for unsized materials, such as hosiery, and other cotton knit goods; for other materials in which sizing mixtures have been used in its manufacture, the time ought to be considerably extended, to even twelve hours; in this connection we would state it as an axiom, that proper care in boiling makes successful bleaching possible.

The amount of alkali used in the preliminary boil has much to do with the question of elasticity; if too much is used the elasticity suffers in proportion, especially if caustic soda be used, and the surplus quantity is of course simply wasted, while if too small a quantity be used, the solvent and saponifying character of the boil is rendered less effective. The happy medium between too much and too little should be determined by the bleacher himself, to best suit the grade of cotton in hand. On general principles, we would recommend three or four per cent. of soda ash, or if caustic soda is considered necessary, one and one-half pounds caustic soda and two pounds of soda ash, to each one hundred pounds of cotton goods.

Our remarks in this instance apply to cotton knit goods, sewing thread, and any unsized cotton goods.

The operation of rinsing the goods as they are taken from the lye boil, though apparently a very simple one in itself, is, however, one that will well repay for being carried out in a very thorough manner; ordinarily, this is done in a very hurried manner, with little if any regard paid to the real object in view, namely, to get rid of all the dissolved impurities of the cotton, and to have it in as clean a condition as possible before entering upon the next operation, that of bleaching proper.

At this point of our discourse we shall refer to the loss of tensile strength of the goods and the harsh conditions obtained, which may occur to a greater or less degree, according to the precautions taken, in bleaching with chloride of lime solution.

A proper understanding of the uses and purposes of the materials used, may contribute somewhat to a more intelligent application of the same. The lime present in bleaching powder in no way contributes to the effect of bleaching, but is present merely for the purpose of serving as a convenient carrier of the chlorine gas (the active bleaching element), and may therefore be regarded as a necessary evil, since its presence is so largely responsible for the harsh condition of some bleached goods, for the removal of which much of the subsequent labor of washing is rendered necessary. By whatever method the bleaching powder is dissolved, the object sought is the same, namely, to bring into solution all of the available chlorine which is readily absorbed by the water; on standing a sufficient length of time the lime settles to the bottom of the vessel, the resulting liquor being clear, and of a slightly greenish color. This represents the bleaching liquor in the condition most desirable and ready to make up the bath in which the goods are to be bleached, which is best carried out in a bath of the strength of 1 to 1 1/2 Tw. and manipulated, according to the means provided, and the form of the goods, pieces or garments, for a sufficient length of time or until a sample taken off and washed in acidulated water shows a desirable shade of whiteness.

It is the exception rather than the rule for the small bleachery to be provided with adequate facilities for maintaining a constant supply of bleaching liquor as described. Usually the bleacher is obliged to make use of barrels, or some similar vessel, which offer no rational means of either drawing off and straining the liquor, or for conveniently removing the lime which has settled to the bottom of the vessel; in such instances the bleacher has to resort to the use of a dipper, which so agitates the liquor that by the time he has dipped about half of the quantity needed, instead of having a clear, transparent liquor, he has a semi-liquid mass, more resembling a bucket of whitewash than bleaching liquor; under such circumstances as this

a hydrometer can be of little use, and the bath is made up by sheer guess instead of by accurate measurement.

It is unnecessary to remark on the great waste of bleaching powder, incident to a system of this kind, amounting in one instance that has come under my observation to 30 to 40 per cent. all due to not thoroughly grinding or crushing out all the lumps.

A very convenient, though not costly arrangement for this purpose, which answers very well for the requirements of a small bleachery, is shown in Fig. 1. It consists of a square tank, lined with lead, in which is set an iron perforated drum, also lined with lead and provided with an opening at the top in which to put in the bleaching powder and water; the cover is then fastened down, and the drum caused to revolve by means of a pulley. When the necessary quantity of bleaching powder is all dissolved, the drum is stopped and the liquor allowed to settle clear; the clear liquor is then drawn off into a barrel, or other suitable vessel, by means of a faucet placed one foot from the bottom of the tank. The sediment is removed by means of a drop door placed at the bottom of the tank.

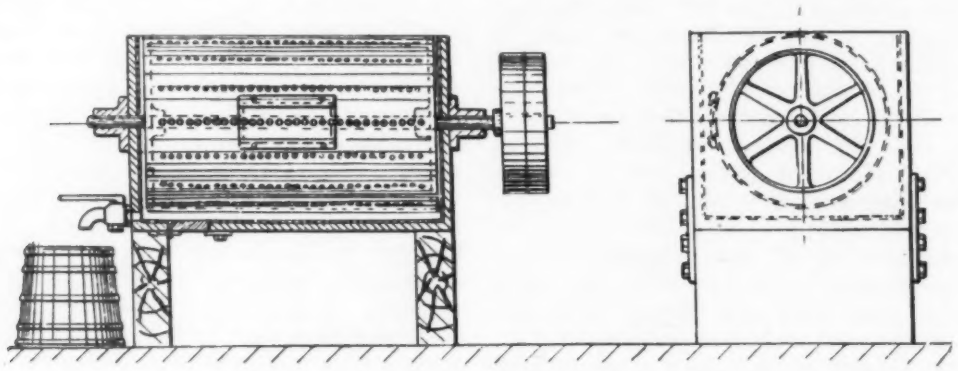
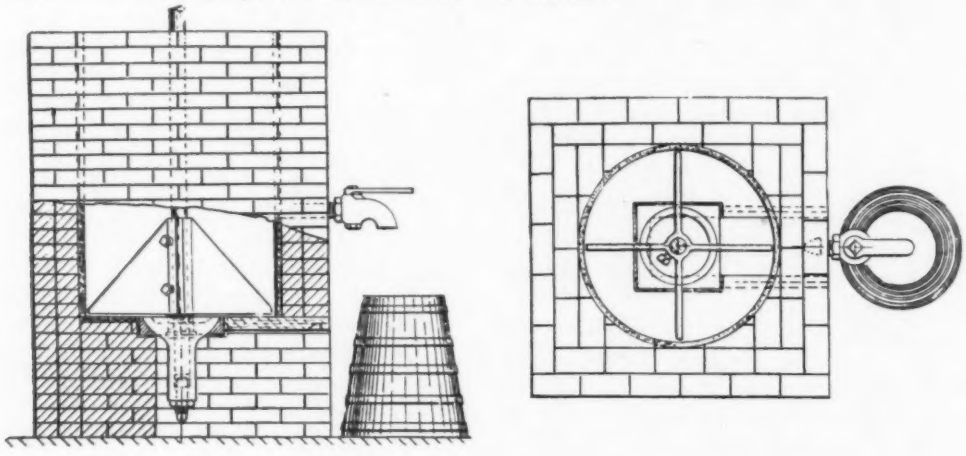


FIG. 1.



SECTIONAL VIEW. FIG. 2. PLAIN VIEW.

Fig. 2, shows a ground and sectional plan of another arrangement for dissolving bleaching powder, adapted to the requirements of a large bleachery, and consists of a round iron tank, lined with cement, set in a brick work structure. The agitator is a vertical shaft on

which is fastened four wings or paddles, and is driven by bevel gears. After sufficient agitation, the power is stopped; when the liquor has settled clear, it is drawn off by a copper pipe, connected with the iron tank at a point immediately above the top of the paddles and extending through the exterior of the brickwork. The sediment is removed by withdrawing a slide door underneath the tank, an opening being left in the brick structure for this purpose.

The washing operation which follows the chlorine bath is one that needs to be carried out in a very thorough manner, if it is desired that the goods shall have that "soft feel," so indispensable to knit goods; unless this operation is carried out as described, the lime which has penetrated the fabric will in the next operation, that of scouring, be converted into sulphate of lime; the presence of this substance in the finished goods, is the real cause of the objectionable harshness.

The souring operation is best carried out in a bath made up to 1, to 1 1/2°, Tw. with sulphuric or hydrochloric acid; in general practice the former will be found the most economical, but in instances where the water contains much iron we would advise the use of hydrochloric acid. It is necessary that the goods remain in the sour until all the chlorine has been acted upon and liberated by the acid, after which follows repeated washings, to get rid of the acid. In order to ascertain just when this has been accomplished, the following simple test may be resorted to. Place a small sample of the goods in a suitable vessel, with sufficient water to cover same, gently heat it for about five minutes, and test the water with blue litmus paper; if the blue litmus paper is turned red, it indicates that the goods still retain acid and would be benefited by further washing until the test solution is shown to be neutral.

This ends the bleaching process, though, more often than not, it is considered necessary to soap and tint the goods, which may, and is usually combined in one operation.

The better the bleaching has been done the less necessity there will be for tinting, or bluing, unless it is required to match some particular tint in a submitted sample. If the goods, after bleaching, incline a little to a "creamy" tone, the yellow is counteracted by tinting with a red shade of blue; but with a very clear white ground, a very small portion of pure blue shade gives a very satisfactory result.

THE NATIONAL AUTOMATIC KNITTING AND OVERSEAMING MACHINE.

The knitting machinery built by the National Automatic Knitter Co., 724 Cherry St., Philadelphia, has been in operation in some of our best mills for years where it has proved its capacity for a large and economical production of perfect goods. Fig. 1 is the National automatic hosiery knitter. It is a sprung needle machine and give the elasticity smooth clean face and clear wale characteristic of that type.

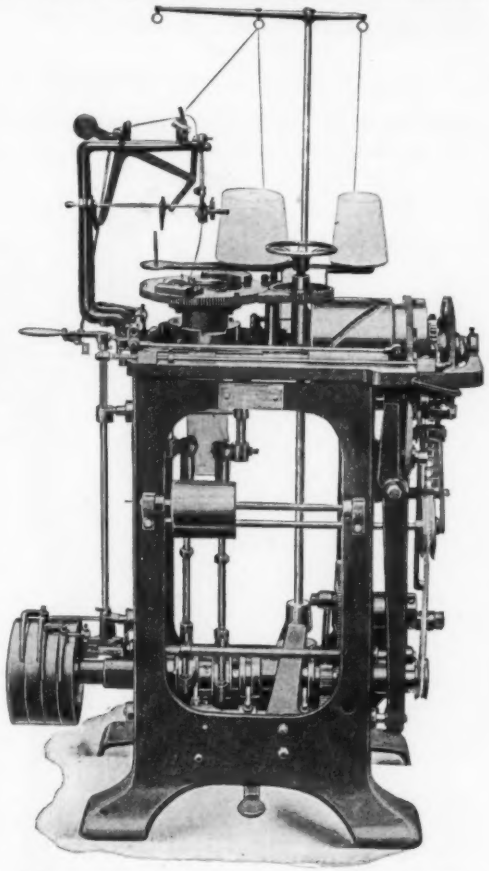


FIG. 1. THE NATIONAL AUTOMATIC HOSIERY KNITTER.

The device for producing lace effects is simple and effective, producing an unlimited

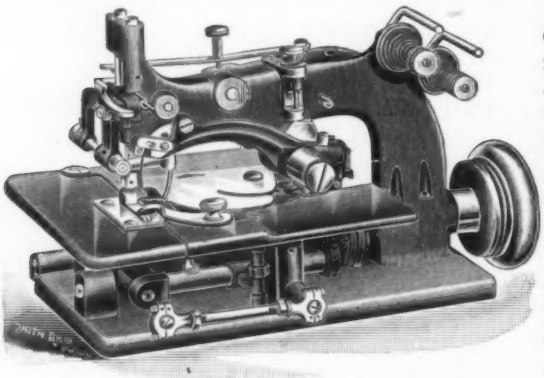


FIG. 2. THE NATIONAL OVERSEAMING MACHINE.

number of styles, with the pattern extending all around, removing or introducing any de-

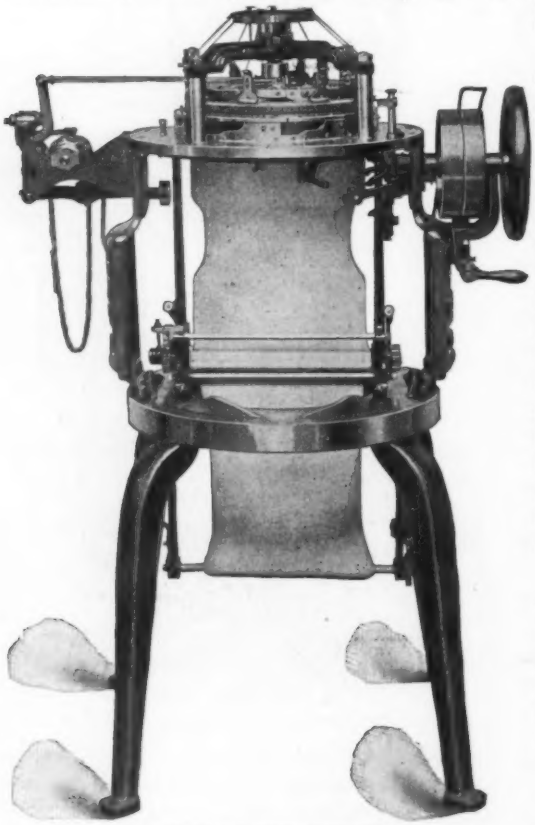


FIG. 3. THE NATIONAL RIBBED UNDERWEAR KNITTER.

sired needles automatically at the proper time. The same device also produces what is known as the seamless fashioned stocking (patented).

The entire absence of knitting-cams and cam cylinders and our exclusive method of forming and casting the stitch, make this machine capable of extremely fine gauges. There are many more of these machines containing over 200 needles in successful operation than of all other makes combined. At the same time it is equally successfully on any of the coarser gauges.

The National Co. has recently perfected a new method of transferring half hose tops or ribbed legs that is extremely simple, rapid and positive; these points added to the great speed of the machine, make it a very large producer of rib hose.

A speed of 300 revolutions per minute is guaranteed, and it is adapted for the production of a wide variety of laces, gauzes and other fancy effects, as well as plain goods.

The National overseaming machine is shown at Fig. 2. The popular two-thread elastic concealed stitch welt is produced with this machine on hosiery of all kinds and is an important feature in the finish of the goods. It is also used for overseaming underwear.

The stitching needle passes through the fabric near the edge, and on its return movement is met by the looper, which carries a loop of thread from the needle around and slightly above the surface of the needle plate, where it is met by a secondary needle, which carries an interlooping thread through the needle loop. This is tied into the fabric by the action of the needle on each succeeding stitch, the movements being so simple and rapid that there is no friction or abrasion on the thread, which, of course, results in a strong, firm and reliable seam.

Fig. 3 shows the National ribbed underwear machine, adapted for a large production of all classes of underwear with plain, shaped and fancy stitches. This machine contains many valuable features of importance in the manufacture of ribbed fabrics; also several important recent improvements that add to the quantity and quality of the production, among others being the arrangement of the cylinder and dial adjustments, the positive measuring device, suspended take-up rolls and supplemental stop motion, all of which are positive, and insure the best obtainable

results. The fabric produced on this machine is of even texture, and is recognized for its elasticity.

Fig. 4 shows the National hosiery ribber for children's and women's ribbed hose in all sizes and gauges, and the builders are confident that it is not excelled for production or quality of goods by any machines on the market.

In addition to the four machines to which

FIG. 4. THE NATIONAL HOSIERY RIBBER.

we have called attention, the National Automatic Knitter Co. builds crochet, shell stitch and single thread sewing machines for underwear and other uses. Samples of the work of any of the National machines with full information can be obtained upon application to the company.

In 1812 there were 53 cotton mills within thirty miles of Providence, operating about fifty thousand spindles.

Recent Knitting Patents.

KNITTING MACHINE, Straight. 755,135. Harry A. Houseman, Philadelphia, Pa., assignor to Standard Machine Co., Philadelphia, Pa.

KNITTING MACHINE Needle. 757,378. Charles R. Woodward, Nottingham, England.

KNITTING MACHINE Needle. 757,708. Stephen Woodward, Franklin Falls, N. H.

KNITTING MACHINE Thread Presenting Mechanism. 755,975. Charles H. Whitcher, Ipswich, Mass.

STOCKING. 757,390. Lillian Calkins, Grand Rapids, Mich., assignor of one-half to Mabel B. Draper, Grand Rapids, Mich.

The Nevershrink Process.

This process of making woolen knit goods nonshrinkable has been advertised for some months by Charles H. Heyer, of Bustleton, Pa., who is general sales agent for it, and we learn from him that many manufacturers have been interested in the advertisement and that he is rapidly making arrangements to place the process in the hands of mill men in various sections of the country. Among the plants recently purchasing the rights is the Truro Knitting Mills Co., of Truro, N. S., and considerable interest in the process has been taken abroad, where negotiations are pending for the sale of rights. Mr. Althouse, the originator of the "nevershrink process" guarantees that it will absolutely prevent the shrinkage of woolen goods, and interested parties are invited to send samples to be tested.

KNITTING MILL NEWS.

New Mills.

*Idaho, Boise City. Operations will start about April 20th to the 25th in the new Boise City Knitting Mills. Knit goods, union suits, shirts, drawers, sweaters, etc., for men, women and children will be made. The plant will be equipped with 4 knitting and 4 hosiery machines and 4 sewing machines. Charles Pond and J. E. Merrill are the owners of the mill.

Massacchusetts, Lowell. A small knitting mill for making seamless half hose has been started here by W. A. Eastman. He operates six auto (Hemphill) machines. Contemplates adding additional machinery.

*New York, Amsterdam. The new mill in which J. Barnes and J. D. Blood are interested is the Chalmers Knitting Company. Capital stock is placed at $25,000; David W. Chalmers is president of the company and John R. Blood, treasurer. They will start operations June1st, making balbriggan ribbed underwear, for men, women and children, using yarns (cotton) from 7's to 22's and worsted 36's to 40's. Goods are sold direct through New York office, 346 Broadway.

New York, New York. The Ardsley Knitting Mills Co., recently incorporated with a capital of $10,000, has succeeded and taken over the business of the Riverside Knitting Mill Co., at 407-13 E.

91st St., where they are still operating the machinery of the old company. Edgar L. Auer is superintendent of the plant. They manufacture ladies' Swiss ribbed vests of mercerized cotton and lisle on 18 machines, using 25 sewing machines for finishing the goods. The goods are sold through Critten, Clift & Co., N. Y. Use steam and gasoline.

Pennsylvania, Philadelphia. Tam o' Shanters, toques, etc., are being manufactured on 7 knitters with worsted yarns 9's to 2/17 by the Carlton Knitting Co., E. S. Rogers, proprietor, and A. W. Hess, superintendent, in the Godshalk Mills, 24th and Hamilton Streets. The company is very busy selling the goods direct from the mill.

*Pennsylvania, Scranton. John A. Mears, W. P. Boland and C. E. Chittenden are interested in the Perfection Knitting Mills, to be incorporated with capital stock of $100,000. Clemens Lenke, formerly owner of the Hawley Knitting Mills, will be manager of the new concern. Sweaters and all kinds of knit goods will be made.

*Pennsylvania, So. Bethlehem. Foundations been put in for the new knitting mill to be erected here for William H. Jacobs. Gorman Bros. are building the mill which will be 103 by 45 feet, three stories, brick.

New York, New York. The Colonial Knitting Mills, recently incorporated, has taken over the business of the Hudson Knitting Works, 147 Lispenard Street and started operations at 145-149 Centre Street, corner Walker. The capital stock is $10,000; J. L. Shuldener is president of the company, Wm. Feinburg, treasurer and S. Feinburg, secretary. They operate 15 machines, manufacturing a fine line of full fashioned wool and worsted ribbed and Shaker sweaters, blouses, etc. Goods are sold direct. Mr. Shuldener is also superintendent of the plant. He states that they intend increasing the capacity of the plant and expects to place an order for several more machines shortly.

New York, N. Y. J. J. Lippman, for six years superintendent of the Manhattan Knitting Mills of this city, and a Mr. Silverberg, have started up the Manhattan Knitting Works, where they are operating 12 spring and 4 latch needle knitting and 3 sewing machines on sweaters, blouses, German hose, socks, stockings, athletic goods, foot and base ball hose. The goods are sold direct. Plant is located at 18 Lispenard Street, and run by steam, which will be supplanted shortly by electricity.

*South Carolina, Walhalla. The Oconee Knitting Mills have been incorporated with capital stock of $15,000. This is the mill project in which W. John Schroeder is interested.

Pennsylvania, Seeleyville. Incorporation papers have just been granted the Honesdale Glove & Mitten Co. of this place, with a capital of $20,000.

Wisconsin, Plymouth. A small knitting plant has been started here by C. H. Bonsa manufacturing misses', ladies' and men's hosiery. Three knitting machines are to be operated; buy woolen and worsted yarns.

Enlargements and Improvements.

Connecticut, Windsor Locks. The Medlicott Co. is installing additional machines in the plant.

Michigan, Lexington. John L. Fead & Sons, manufacturers of yarns, half hose, and mittens, have added considerable machinery to the plant during the past winter, including a generator and are now furnishing their own lights.

*Michigan, St. Joseph. Cooper, Wells & Co. advise us that they expect to build a large two-story warehouse and are contemplating erection of a new dye house (not of steel), but this has not been decided. The buildings are to take the place of those now in use and are not to be for increasing the machinery nor capacity.

*New York, Syracuse. The Oak Knitting Co. has under consideration building of an addition to the plant, but the matter will not be taken up and definitely decided upon until the return of Mr. C. E. Krouse, now in Europe. The company has started manufacturing a fine grade of goods for which new machinery has been installed.

North Carolina, Fayetteville. The Fayetteville Knitting Mill contemplates installing a lisle finishing dye plant for fast black hosiery.

*Ohio, Wapakoneta. The Wapak Knitting Co. advises us that they have not yet made any decision regarding new machinery and improvement for the present, but no doubt they will do so in the near future.

*Ontario, Hamilton. The Eagle Knitting Co., reported to build an addition to its mill, will endeavor to secure a site and erect a new plant instead.

Pennsylvania, Mohnsville. Twelve new knitting machines have been installed in the Leininger Hosiery Mills.

Pennsylvania, Reading. The firm of Geiger & Groff, now located at 17 South Front St., will remove in a short time to Moss and Douglass Sts. A change will also be made in the company, which will be known in the future as Geiger & Scarlett. They manufacture men's cotton half hose on 51 machines, selling the goods direct.

Pennsylvania, Reading. A two-story brick building, 130 by 90 feet, will be erected on Elm Street for W. F. Taubel (Riverside, N. J.), who will equip same as a knitting mill.

South Carolina, Manning. Extensive improvements are to be made to the Manning Hosiery Mills.

Pennsylvania, Wilkesbarre. The knitting mill owned by William P. Morgan and John Sturdevant has been incorporated with capital stock of $50,000. W. D. Morgan is president of the concern, John Sturdevant, vice-president and Joseph D. Lloyd, secretary and treasurer. The mill is equipped with 152 knitting machines and dye house.

South Carolina, Williston. The Rosemary Knitting Mills are reported to increase the capital stock for purpose of installing yarn machinery in the plant. They also propose doubling the electric light plant.

Tennessee, Chattanooga. An addition is to be erected by the Richmond Hosiery Mills for the purpose of manufacturing their own paper boxes.

Virginia, Portsmouth. The Lewis Jones Knitting Co., of Winchester, will start a branch factory at this place.

Virginia, Lynchburg. The Providence Hosiery

Mill, O. Nestler & Sons, proprietors, expect to build a dye house in the near future. This is quite a new mill, having only started last July, to manufacture a high grade of cotton seamless hosiery, have been operated in full since starting in business and report a very good outlook for the future.

*Virginia, Wiliamsburg. The Williamsburg Knitting Mills, which recently increased the capital stock $30,000 for the purpose of enlarging the plant, have started work on erection of a building, 50 by 19 feet, two stories, and one 45 by 35 feet. They will install spindles for manufacturing yarns.

Mills Starting Up.

Michigan, Detroit. The Chicago Hosiery Company will shortly resume operations after being shut down all winter.

New York, Fort Plain. Operations will be resumed the latter part of the week in the Bailey Knitting Mills, which were damaged by the recent high water.

Pennsylvania, Richland Station. The Richland Knitting Mill Co., which has been closed for some months, expects to start up very soon on men's half hose. It operates 21 knitting machines. Levi R. Bollinger is president; D. R. Sheetz, treasurer; D. N. Shanaman, secretary. Capital stock is $7,000. They buy yarns, 8's to 16's, white and mixed.

*Wisconsin, Racine. The Racine Knitting Co. has been incorporated to operate the Beloit plant of the Racine Knitting Co., recently reported purchased by Fred C. Lorenz. It is expected that the plant will be in operation in a few days.

Mills Shutting Down.

*New York, Amsterdam. The Sovereign Knitting Company will be dissolved. E. Watson Gardiner has been appointed receiver to distribute dividends.

New York, Greenwich. The Van Zile Knitting Co.'s mills have been closed for an indefinite time owing to scarcity and high price of cotton.

New York, Fort Plain. Damage at the Bailey Knitting Mills, caused by the ice jam and flood, was very serious, and the plant has been stopped for several weeks for repairs. Foundations under the central post at one building were washed away and let down two floors, one of which was filled with knitting machinery, and caused much damage and trouble.

Facts and Gossip.

Alabama, Birmingham. It is reported that George W. Kavanaugh, James E. McLaughlin and Frederick W. Kavanaugh, manufacturers at Waterford, New York, contemplate building a branch mill in the South, and are investigating the advantages of this city.

Alabama, Ozark. H. M. Sessions and W. L. Casey are reported as contemplating establishment of a knitting mill here. They are soliciting subscriptions toward the capital stock and will probably arrange to instal spinning machinery also.

Massachusetts, Lowell. The Waukenhose Mfg. Co. is to be re-organized as the Waukenhose Knitting Co, and will take the entire equipment of the former concern. G. W. Haskell (Boston), is treasurer of the concern.

*New York, West Sand Lake. The McLaren Knitting Mills and real estate and other assets of J. & R. McLaren, were sold April 13th by H. D. Bailey as attorney for Michael F. Sheary. The property was first sold in parcels, and J. E. McLoughlin bid in $800. for the stock of knit underwear. The second parcel consisting of manufactured goods (3,000 dozen shirts) held in commission by Bacon & Co., New York, had been disposed of at private sale to Bacon & Co. The third parcel consisting of water rights, appurtenances and real estate, was bid on by John J. Ryan, at $1,050. The stock and mills were then offered together at a single bid and Mr. Ryan bid $1,900, subsequently raising bid to $7,000.

New York, Whitesboro. The Alliance Knitting Mills have started closing the mill on Saturday noon.

North Carolina, Tryon. It is reported that A. D. Beaton & Sons are starting a small knitting mill, for manufacturing underwear. The plant will be in partial operations latter part of the month.

*Pennsylvania, Collegeville. The machinery equipment and fixtures of the Perkiomen Knitting Mills have been sold by Samuel K. Anders, trustee for the creditors.

Pennsylvania, Philadelphia. Part of the machinery of the E. H. Godshalk Co., at 24th and Hamilton Sts., is being run by the Wright Health Underwear Co. of Troy, N. Y., on samples. It cannot be said at this time whether these people intend to operate a branch mill here or not.

Pennsylvania, Philadelphia. The Baker Mfg. Co., 41 Ashmead Street, Germantown, is very busy manufacturing high-grade knit gloves, jackets and sweaters of all kinds, selling the goods through New York. This company also runs a weaving department on Lena Street above Church, in which they make horse blankets, shawls, and lap robes, This department, however, owing to the fluctuating prices in the cotton market has been shut down and they cannot say at present whether they will start it up again or not. In the knitting department they operate 50 latch and 10 spring needle knitters and 12 sewing machines, using both gas and steam as the motive power.

*Wisconsin, Racine. The Racine Feet Knitting Co. has been incorporated with a capital stock of $125,000 to operate the Beloit plant of the Racine Knitting Co. J. W. Amends will be manager of the mill.

Wisconsin, Stevens Point. The Racine Underwear Mills have been incorporated with capital stock of $6,500, by L. Brill, E. J. Pfiffner and G. E. McDill.

Personals.

George W. West, Jr., has been engaged to take charge of winding and reeling at the Elmira Knitting Mill, Elmira, N. Y.

T. H. Morris, superintendent of the Clover Knitting Co., Waterford, N. Y., has resigned.

Thomas H. Morris has resigned as superintendent at the Clover Knitting Mill, Waterford, N. Y.

W. C. McCloud, formerly with Phillips & Co., Port Carbon, Pa., has engaged with the Coplay Knitting Mill Co., Coplay, Pa., as general foreman.

New Machinery and Processes.

This department is designed to present from month to month a brief mention of new machinery, devices, and processes being brought out in this country and abroad, that are of interest to textile manufacturers. It is not a list of patents, but of improvements coming on the market. The idea being to present to our readers a systematic monthly record of new machinery, etc., of interest to textile mill men.
We invite machine builders and others to send us such information for this department.

Wool Card. James H. Whittle, Worcester, Mass., is introducing an important improvement in wool cards, invented by J. J. Henderson and described in this issue.

Ring Frame for Woolen Yarn. C. L. Flaccus, 224 North Third St., Philadelphia, Pa., is placing on the market a ring frame for spinning woolen yarn. A description appears in this issue.

Improvement in Bobbin Holders. Murdock & Geb Company of Franklin, Mass., are bringing out an improved bobbin holder for mules, winders and twisters, the invention of T. J. Murdock. The cup holder has three holding lugs, interlocked in a T slot. The advantages are that it will take in a large variety of different sizes of bobbin heads, with a perfect grip on the bobbins, and its extreme durability.

Thread Cutter for Northrop Loom. The Draper Co., Hopedale, Mass., have brought out a new thread cutting device for their automatic loom. As the bobbin or cop skewer is ejected before the filling is woven off clean, it must necessarily remain attached to the cloth by the end of yarn still dragging from it. The shuttle, after being supplied with a new bobbin or cop, would drag this old thread back into the cloth as well as its new thread unless the old thread were cut. It is therefore necessary to provide mechanism which shall part this thread, as the regular temple thread cutter does not engage it.

Tandem Pedal Motion Regulator. Howard & Bullough, Accrington, England, have recently brought out a regulating motion for scutching machines which is said to be very sensitive. The two superposed cotton holders act independently on the same feed roll. The upper holder with which the cotton comes in contact first connects with the regulator pendants and not being influenced by the blow of the beater moves more freely than hitherto. The shock caused by the beater is taken up by the lower holder, which is weighted.

Loom Reed. Emil Joerschke, Krefeld, Germany, has recently brought out a loom reed for the production of fancy stripe effects. The reed is divided into short sections in which the wires are arranged in crescent form and placed opposite each other so that the narrowest part of the group is in the centre and the widest part at the ends.

Warp Stop Motion. The Textile Appliances, Ltd., Glasgow, Scotland, have introduced a new warp stop motion designed to overcome the defects developed in previous devices of this character. It is so constructed that it can be used either to stop the loom or simply to give a signal when a thread breaks. Instead of the usual detector or drop wire a device is used, it is said, which simplifies the working of the stop motion.

Wool Scouring Machine. Edouard Lessene, Tourcoing, France, has recently brought out an improvement for a wool scouring machine. It consists in using an endless chain fitted with pins for drawing the wool from the bath to the squeeze rolls. It is claimed that the new device draws the locks of wool lengthwise and prevents the curling and matting of the wool, as in the machines now in use.

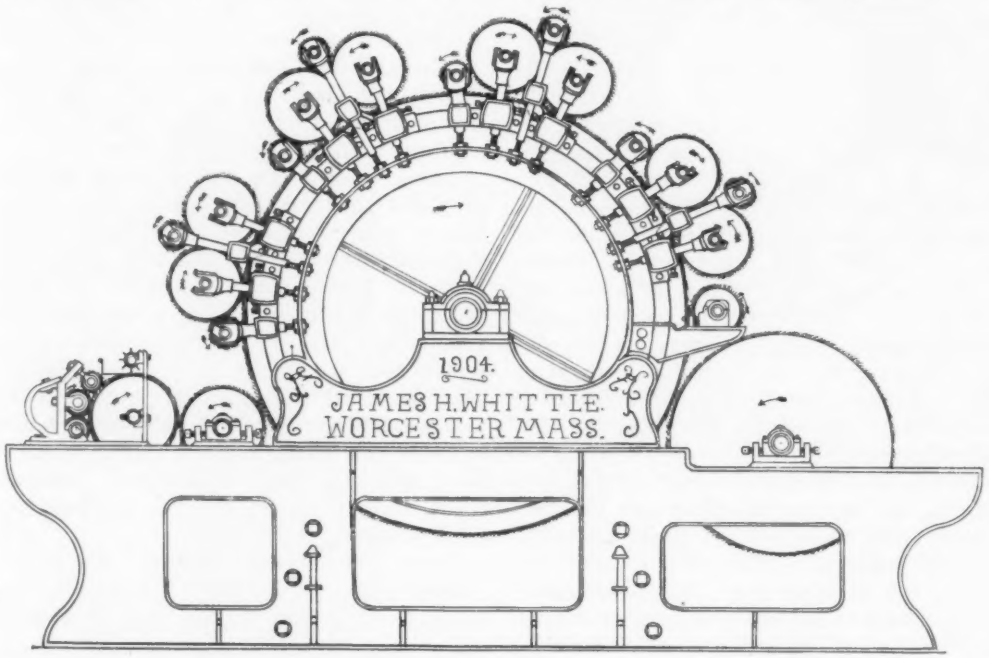
Automatic Spool Changer. Jules Devallee, Roubaix, France, has recently placed on the market a device for automatically changing spools on woolen cards. It is said to be completely automatic and to effect a considerable saving in labor.

THE WHITTLE DOUBLE WORKER CARD.

AN IMPROVEMENT IN WOOL CARDING.

The modern wool card and the old custom carding machine for carding wool rolls to be spun on the hand wheel are built and operated on the same principle. In both old and new machines the stock passes to a main cylinder which cards the material in contact with smaller rolls called workers. The stock is carried from the workers back to the main cylinders by still smaller rolls, called strippers, and the process is repeated by successive pairs, each consisting of worker and stripper, until it is delivered by the doffer. The only difference between the old and the modern wool card is found in the details of construction, the arrangement of the carding rollers and the order of operations being the same in both. The machinery of other processes of textile manufacturing has undergone transformations in principle as well as in details of construction, but the woolen card has proved an exception to the rule and remains unchanged in principle.

The survival of the primitive form of the wool card seemed to prove either the exceptional ability or lucky chance by which it was originally designed. This theory has recently received a rude shock by the invention and successful operation of a new method of carding wool, the invention of J. J. Henderson, a practical carder and woolen manufacturer of many years' experience. The new card, a sectional view of which is shown in the accompanying illustration, is built by James H. Whittle, 150 Harlow St., Worcester, Mass.



The improvement consists in arranging the workers in pairs, as shown, thus economizing space and enabling more workers to be used without increasing the diameter of the cylinder. The wool enters the card and is carried to the first worker and stripper in the usual way. This worker is run against the cylinder as is frequently done in the ordinary card The next worker, which is close to but not in contact with the first one, is run with the cylinder. The stock is carried from the second back to the first worker by a slowly running stripper placed between and above the workers, and then passes back to the cylinder to be carded again. The stock carried past the first pair of workers by the cylinder success-

ively meets the other pairs of workers, at each of which the same process of carding and mixing is repeated.

This brief description tells the story of a process whose advantages are evident and whose simplicity prompts the question, Why did not some one think of that long ago? It not only increases the carding capacity by enabling more workers to be used, but also mixes the stock more thoroughly. The capacity of the ordinary wool card is limited by the carding surface of the machine. Occasionally wool is carded so easily that the production of the machine is limited by the capacity to feed, doff and condense the material, but almost invariably the attempts to increase production are thwarted by the limited capacity of the carding surface. Hence the increase of both width and diameter in the endeavor to increase the product of the card. The increase of width or diameter does accomplish that object, but it is generally admitted that it entails some disadvantages. Nearly every carder will agree that any increase of width or diameter above 48 inches is often at the sacrifice of solidity and convenience in operation. By the new Whittle card the object desired, increased carding surface, is attained, not only by increasing the number of workers, but also by increasing the number of times the stock is returned to the cylinder, to be recarded by the double worker process. The gain in carding capacity is thus made greater than is indicated by the increase in the number of workers.

When the character of the goods necessitates the use of three cards to a set to obtain the required doubling, the advantage of the new arrangement consists of increased production, better carding and mixing of the stock, the convenience of a small card and economy of power. For many kinds of low grade stock and piece dyed goods extra doubling on the card is not necessary or even possible. In such cases the new method makes it possible to dispense with the second breaker and connect the finisher to the first breaker by an automatic feed. We recently saw a two-card set equipped with the new method and running beside an ordinary three-card set. Both were 42 in. by 42 in. machines. The breaker of the Whittle card has 4 pairs or 8 single workers, while the two breakers of the ordinary card had 10 workers. A comparison of the work from the two cards dispelled any lingering doubts regarding the merits of the new method. The stock was a mixture of 20 per cent. white and 80 per cent. black. The white wool was short, nibby and specky territory; the black stock consisted of noils and rag shoddy. The ordinary three-card set was doing good work with this very tough combination. The work from the two-set Whittle card, however, was a revelation. The roping from the Whittle card was much clearer and smoother than that from the three-card machine and demonstrated beyond cavil the merits of the new process.

As will be readily understood, old cards can be easily changed for the new method. In this way the capacity of a card room can be materially increased without adding new machinery. Mr. Whittle is prepared to equip old cards with the Henderson attachment or supply new cards as desired. Some years ago he acquired the business of the Cleveland Machine Works and has since improved and enlarged his line of textile machinery, which includes preparing and carding machinery, yarn spoolers, twisters, warpers, beamers, skein yarn dryers, cloth dryers, chinchilla and cloth whipping machines.

Gimp Loom. Renshaw, Burgess & Co., Congleton, England, have recently brought out a gimp loom. At present many of the more complicated gimp patterns are woven by hand. The new machine is intended to displace this hand work and differs from the ordinary patterns in that the lay does not move horizontally and has no part in the beating up of the filling. This work is done by the reed which is mounted on a sliding roll that is really a skeleton lay. This system is not suitable for heavy goods, but is well adapted for such material as gimp.

It is recorded that "in the yeeres of our Lord 1511, 1512, etc., divers tall ships of London" carried woolen goods to the East and brought back, among other things, "cotten wooll," which was mostly used for candle wicks.

RECENT IMPROVEMENTS IN BOBBINS.

We are able to show our readers some important improvements in the method of strengthening or reinforcing bobbins by means of metal shields. The practice in this country has been to use the ordinary plain wooden bobbin without any protection. It is unnecessary to call the attention of our readers to the serious difficulties and great loss caused by the unprotected bobbin. Even when not exposed to steaming, a large number soon become cracked and chipped. The result is continuous loss because of waste unless the broken bobbins are thrown out. This is practically impossible because it would entail a constant sorting of all the bobbins in the mill. When the bobbins are steamed the liability to check and crack is greatly increased.

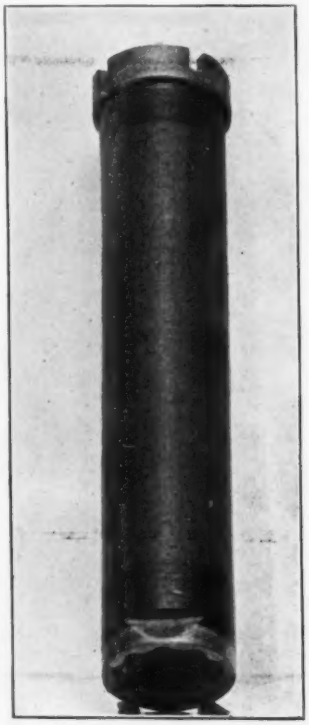


FIG. 1. A SPEEDER BOBBIN WITH "LOCKFAST" SHIELDS.

American manufacturers do not realize the heavy losses resulting from broken bobbins simply because they have always borne such losses and have never experienced any different conditions. In this as in many other respects the English manufacturers are ahead of us. For many years English manufacturers have given close attention to this feature and not only perfected the bobbin itself, but also strengthened by means of metal shields

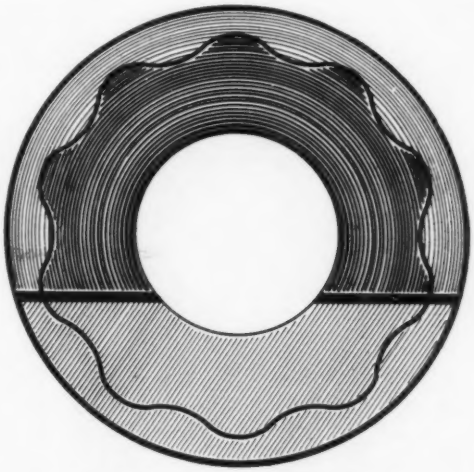


FIG. 2. TOP OF BOBBIN, SHOWING SECTION OF SHIELD.

or protectors the parts most exposed to wear. Great improvements have been made in these shields since they were first introduced and the latest types are shown in our illustrations. They are the product of the leading English firm engaged in this line, Wilson & Co., Barnsley, Ltd., Barnsley, England, for whom Speed & Stephenson, 170 Summer St., Boston, Mass., are sole American agents.

Fig. 1 shows a speeder bobbin with the patent "Lockfast" shields at top and bottom. Fig. 2 is a plan of the top; part of the top shield is cut away and shows a section of the waved or corrugated edge of the shield which is forced into the solid wood without weakening the bobbin by a previously cut groove. It materially strengthens and stiffens both shield and bobbin, and is locked perfectly fast. The inner edge of the shield at the circumference of the bobbin at the top is turned over and into the wood, forming a round smooth beaded edge, effectually securing the shield in position and preventing it from coming off the bobbin. This edge remains smooth and when necessary, the bob-

bins can be cleaned by sliding the yarn over the end without cutting with a knife and without danger of the shield catching on the yarn or cutting the hand of the operative.

The bottom shield, shown plainly in Fig. 1, is fastened in exactly the same way and reduces the internal chipping caused by dropping the bobbin on the wheel or spindle driving studs.

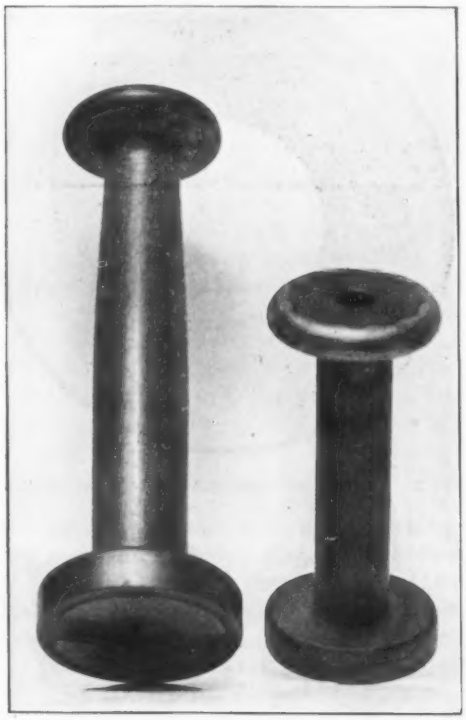


FIG. 5. COMBINATION FLANGE AND SLOT PROTECTOR.

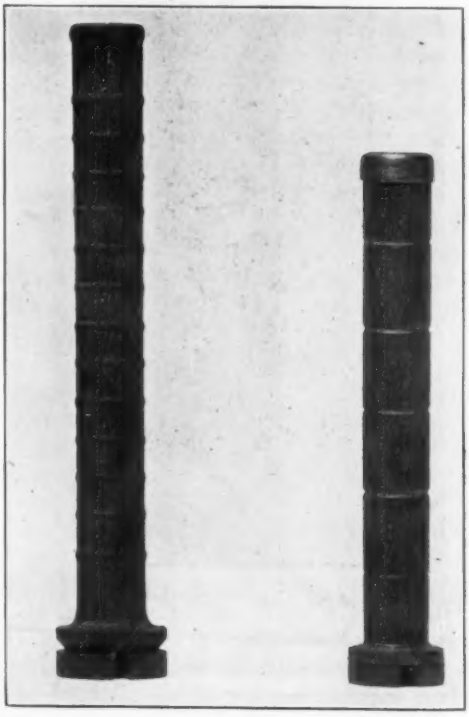
FIG. 3. A WORSTED FLYER BOBBIN WITH SHIELD.

This Lockfast shield can be applied to bobbins of any kind. Fig. 3 shows a flyer worsted spinning bobbin, with the shield applied to the top head only. It can be applied to the bottom head if desired.

Fig. 4 shows the bottom of a ring twister bobbin with the patent Acme slot protector, which prevents the wear of the slot by the pegs in the spindle. When the slot gets worn, as is the case in the unprotected type, the bobbin slips on the spindle causing bad work from soft or uneven twist. This is applicable to all forms of cap frame and ring bobbins, and is a very serviceable device.

Fig. 5 shows a bobbin with the combination flange and slot protector, commonly termed the C.F.S. It is applied to every kind of ring, doubling or cap bobbin. It not only prevents the wear of the slot, but at the same time prevents the splitting of the head.

FIG. 4. THE ACME SLOT PROTECTOR.



THE OLD WAY. A BROKEN SHUTTLE BOBBIN.

THE NEW WAY. A SHUTTLE BOBBIN WITH "CLIMAX" SHIELD.

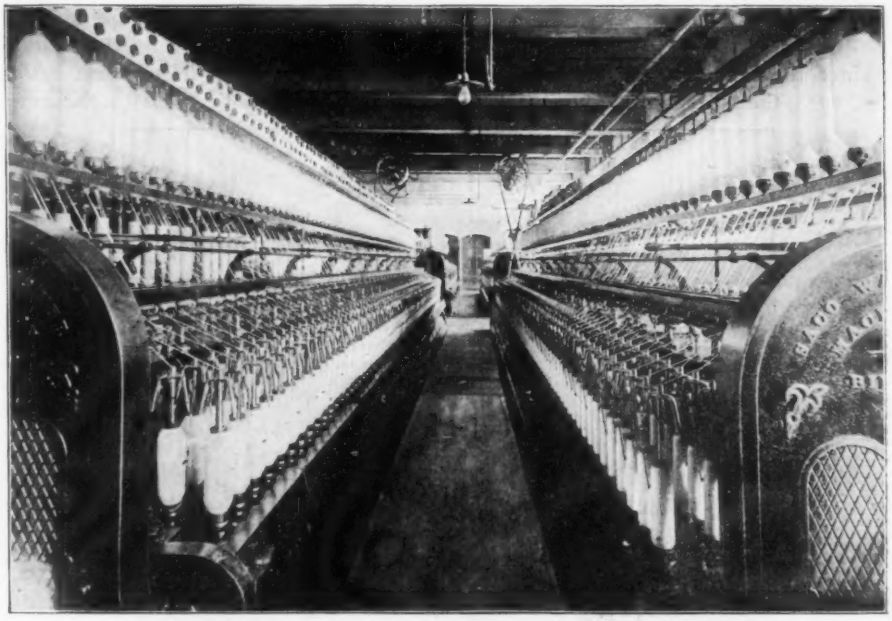
Fig. 6 illustrates the serious difficulty with

unprotected shuttle bobbins. The end has been split with ordinary work, and in that condition is sure to catch and break the yarn, causing waste of material and loss of time.

Fig. 7 shows a shuttle bobbin with what is known as the Climax shield applied to the nose and which prevents the splitting of the bobbin. This shield also facilitates the unwinding of the yarn in weaving, as it serves to keep the yarn from contact with the wood-

ROVING FRAMES FITTED WITH DUNN FLYERS.

The rapidity and ease with which the Dunn flyer has won its way speaks highly for the merits of this American flyer. We have already described its construction and special features such as the short rigid arm, which cannot be deflected by centrifugal force, its perfect balance, the larger bobbin which may



THE DUNN FLYER IN THE ATLANTIC COTTON MILLS, LAWRENCE, MASS.

en barrel of the bobbin, insuring a free and easy weaving. This is warranted to be positively secure on the bobbin as it is fastened on the inside by barbs that enter the wood at right angles to the grain. The outside lower edge is folded and set in the wood presenting a perfectly smooth edge. If desired this Climax tip can be made flush with the barrel of the bobbin.

These metal shields are of great advantage when applied to enamel conditioning bobbins. Being absolutely fast on the bobbin there is no abrasion of the enamel, as is the case with ordinary shields, which work loose, turn around and allow the moisture to penetrate and rapidly destroy the wood and throw the bobbin out of balance.

be built, the ability to run roving with very slight tension, no trouble being experienced by ends flying out of the arm, less drag on the roving and more twist retained, change from coarse to fine work without changing flyer, hardened bearings and general durability.

The illustration shows a view of frames equipped with the Dunn flyer, in the Atlantic Cotton Mills, Lawrence, Mass., and although these are not new frames, their work and production since fitted with the Dunn flyer is highly satisfactory in comparison with newer machines. The work which the flyer is doing in this and many other New England mills has surprised and convinced many who have thought that nothing but the

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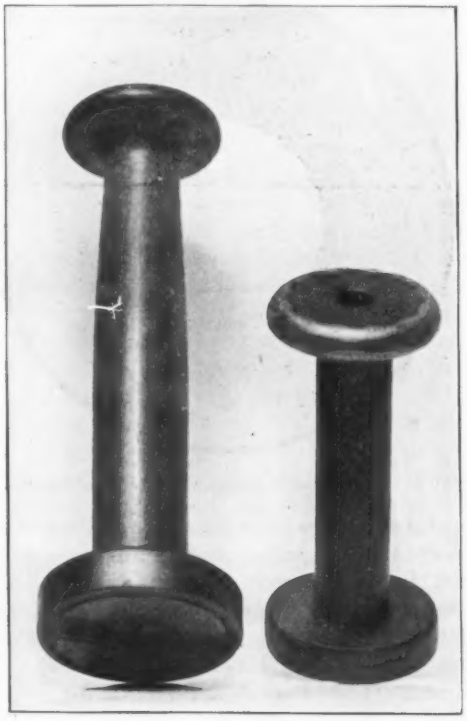

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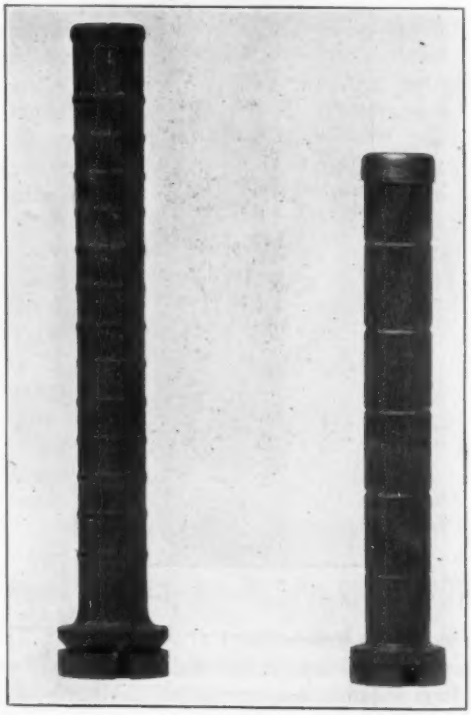

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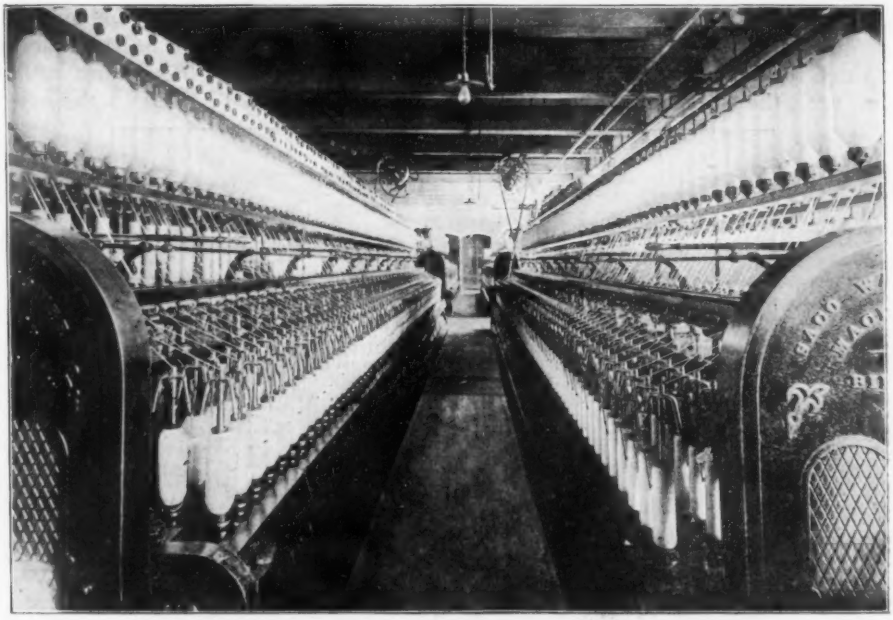

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old style English model flyer could do the work.

The Textile Machinery Company, 50 State St., Boston, Mass., the manufacturers of the Dunn flyer, are busy equipping frames in different parts of the country, and will be pleased to give information in regard to prices and the time at which deliveries can be made.

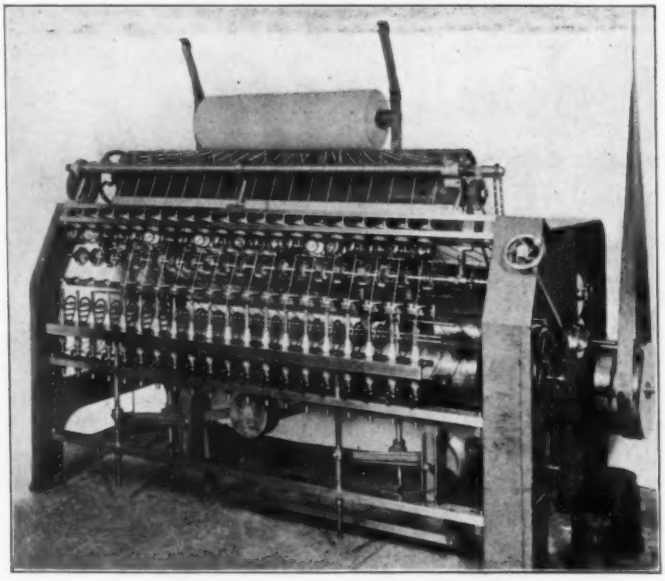
A NEW SPINNING FRAME FOR WOOLEN YARN.

Ever since the invention of ring spinning for cotton yarn, the efforts of many inventors have been directed toward the successful spinning of carded woolen yarn on the continuous principle.

About a year ago we mentioned the fact that Mr. Frank Breeze had invented a spinning frame that spun carded woolen roving. At that time the machine was not fully ready for the market, but it is now patented in Europe and America, and a frame is on exhibition at the Bourse in Philadelphia, where it is exciting the attention and keen interest of woolen manufacturers and spinners.

In this machine the soft roving passes over the rollers, ingeniously arranged to introduce twist roving while drawing it out finer, thus duplicating as far as possible in a continuous machine the principle of the old hand wheel on which our great grandmothers used to spin wool yarn.

A special feature is the head, which is constructed in such a manner as to give a positive delivery and twist in the drawing, faster than any speed required for the ring system. The feed rollers are also constructed in such a manner as to prevent any slipping of the sliver. The ring rail and builder have been especially designed for the spinning of wool. The ball bearing system has been adopted in every instance where friction can be lessened. The bobbins can be filled to the very point without changing the size of the yarn, the operation being a continuous one, and it is claimed that the frame can be readily and easily operated by a girl.



A NEW SPINNING FRAME FOR WOOLEN YARN.

It will be seen from the illustration that the frame is compact; indeed it takes up but one-sixth of the space of an ordinary mule, thereby saving valuable floor space to the manufacturer, with less walking for the operator. It is claimed to give a greater production with less cost than spinning on the mule system.

The design and construction of the machine have been carefully worked out, so as to stand years of hard mill usage with freedom from repairs. This is an important point of advan-

tage over the unavoidable wear and tear of the intermittent motion of mules. The ends may be readily pieced without stopping, when the machine is in full operation. The simplicity of the construction of the new spinning frame is claimed to be such that it does not require so much mechanical ability on the part of the operative to run it as for the operation of the mule.

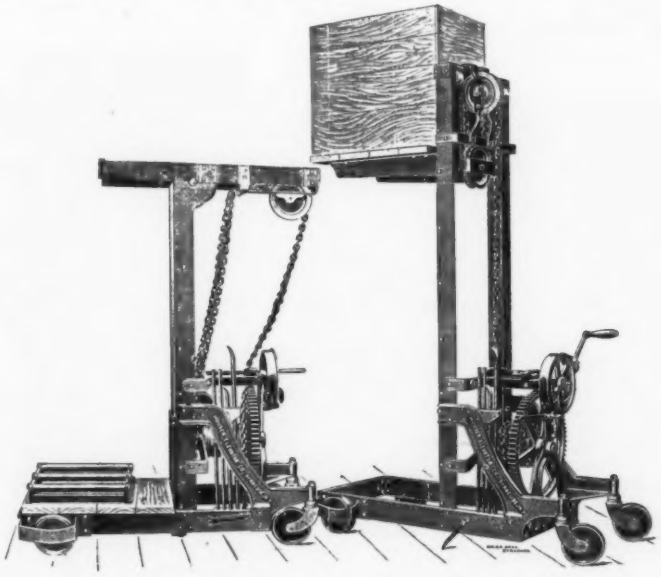
The inventors claim for the machine a saving of at least 50 per cent., also the spinning of yarn more even and uniform, nearly double the yardage being obtained on a bobbin, and that the saving of waste is at least 50 per cent. more than by the mule system. It is claimed to be adapted for spinning not only wool, but mixed fibres of any description.

Parties who are interested in seeing the machine in operation may for the present, address Mr. C. L. Flaccus, 224 North Third St., Philadelphia, Pa.

The spinning of cotton yarn by water power in America was first successfully carried on at Providence in 1791 by Samuel Slater, an Englishman, who built his machinery from the Arkwright models then in use in England.

THE HOUSER PORTABLE HOIST.

The Houser portable hoist built by John E. Larrabee, Amsterdam, N. Y., has been in continuous use for so long that its merits have been demonstrated beyond question. This hoist is a labor saving device, designed especially for piling cases, bales and other material. Although the machine is necessarily heavy in order to insure strength, it can be easily handled and rolled around at will. The front castors turn on roller bearings. The machine is very strong and substantial and formed entirely of steel, and the height is made to suit the work and the height of the ceiling. They are made either with or without a knuckle joint. The joint is necessary only when it is necessary to take a hoist through a door or opening lower than the ceiling, or on a freight elevator with a low cross beam. One man can easily lift 800 pounds with one of these hoists. The rollers of the platform are set in a frame and can be turned in every direction. The hoist is very simple in operation and does not easily get out of order.



THE HOUSER PORTABLE HOIST.

Following are a few of the users of this hoist:

Alliance Knitting Co. (2), Whitesboro, N. Y.; Troy Knitting Co., Troy, N. Y.; Willis Wendell, Amsterdam, N. Y.; H. R. Terminal Warehouse Co., Troy, N. Y.; Camden Knitting Co., Camden, N. Y.; Oak Knitting Co., Syracuse, N. Y.; Capron Knitting Co., Utica, N. Y.; Kendall Knitting Co., Utica, N. Y.; A. J. & C. C. Dowery, Utica, N. Y.; American Tobacco Co., Fulton, N. Y.; Merrill & Co., Syracuse, N. Y.; N. Y. Belting and Packing Co., Passaic, N. J.; Manhattan Rubber Co., Passaic, N. J.; Botany Woolen Co., Passaic, N. J.; Efird Woolen Co., Albemarle, N. C.; Granite Mills, Fall River, Mass.; Thorndike Co., Thorndike, Mass.; Utica Knit Co., Utica, N. Y.; Portland Stove and Foundry Co., Portland, Me.; McCleary, Wallin & Crouse, Amsterdam, N. Y.; Mohawk Knitting Mill, Mohawk, N. Y.; Penman Mfg. Co., Paris, Ont.; Gio Viganoni, Milano, Italy; D. Ullman & Sons, Buffalo, N. Y.; Campbell Knitting Co., Elmira, N. Y.; American Warehouse Co., Spray, N. C.; Union Mills, Hudson, N. Y.; Patterson Mfg. Co., China Grove, N. C.; Northeastern Warehouse Co., Phila., Pa.; Wiscassett Mills Co., Albemarle, N. C.; Gibson Mfg. Co., Concord, N. C.; Cabarrus Mfg. Co., Concord, N. C.; Cannon Mfg. Co., Concord, N. C.; Cordis Mills, Millbury, Mass.; D. M. Collins & Co., Pittsfield, Mass.; Rambo & Regar Co., Inc., Norristown, Pa.; Raft, Murdock & Co., Caryville, Mass.; Atlantic Mills, Providence, R. I.; Parkhill Mfg. Co., Fitchburg, Mass.; Western Electric Co., Chicago, Ill.; Monadnock Mills, Clarendon, N. H.; Shaw Stocking Co., Lowell, Mass.; Ormsby Textile Co., Waterford, N. Y.; Overman-Schrader Cordage Co., Cincinnati, O.; Boston Duck Co. (2), Bondsville, Mass.; Perry Knitting Co., Perry, N. Y.; Royal-Gem Mills Co. (2), St. Johnsville, N. Y.; Albany Metal and Waste Co., Albany, N. Y.; Commercial Storage Co., Hudson, N. Y.; Wayside Knitting Co., Troy, N. Y.; Eddy & Street, Providence, R. I.; Gaffney Mfg. Co., Gaffney, S. C.; American Pad & Textile Mfg. Co., Greenfield, O.; Warren Cotton Mills, W. Warren, Mass.; Aberfoyle Mfg. Co., Chester, Pa.; Friedberger Mfg. Co., Phila., Pa.; Loraine Mfg. Co., Pawtucket, R. I.; Northwestern Knitting Co., Minneapolis, Minn.; Hope Mills Mfg. Co., Hope Mills, N. C.; Griffin Co., Phila., Pa.

It will be seen that it is in use in some of our best mills throughout the country many of whom have sent to Mr. Larrabee very flattering testimonials regarding its value and usefulness. Further information can be obtained upon application to the builder, John E. Larrabee, 9 Market St., Amsterdam, N. Y

The first attempt to introduce cotton goods into England was made in 1500.

A NEW BROOM.

The accompanying illustration shows a broom made from the material called "bassine," which is the inside fibre of the pine tree bark. The broom is manufactured by the Philadelphia Brush Mfg. Co., 123 Green St., Philadelphia, Pa. Bassine is claimed to be the only material ever discovered which is superior to broom corn for the manufacture of brooms. The material is a solid substance

THE BASSINE BROOM.

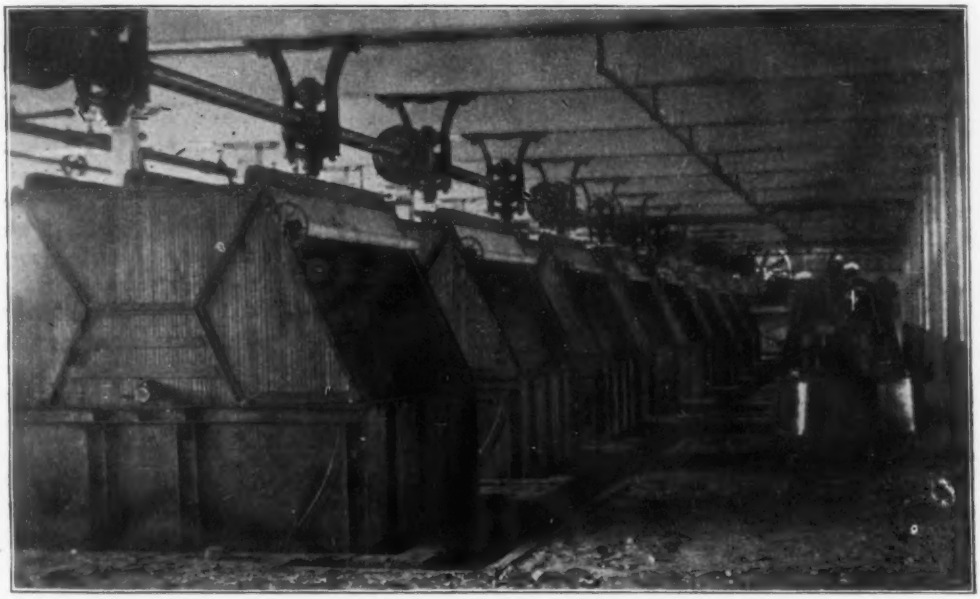
and it is said will withstand the action of water, lye, etc., retaining its shape under the most severe usage. The brooms are made with perpendicular handles, like a corn broom, or with horizontal handles for use as a push broom. In mill use they are said to outwear any other kind.

When worn to within an inch and a half of the block the handle and brace can be removed and this stub will last six months as a hand brush. Broken handles can be replaced and a brush makers' comb is supplied with each order. When required the brooms are soaked in water and cleaned on the comb. Further information can be obtained from the manufacturers who are receiving repeat orders for this broom.

The first calicoes were made in Lancashire about 1772.

BLEACHING RAW COTTON.

Of late we have received several inquiries for information regarding a practical and economical manner of bleaching raw cotton. While we are not in a position to compare the different mechanical devices and processes in use, we are able to describe a plant that is in operation in Massachusetts and which is giving satisfaction, both as regards the condition of the material, and also the cost of production.



A KLAUDER-WELDON BLEACHING PLANT FOR RAW COTTON.

This plant is very complete, occupies a very small floor space, and has all the appearances of a very durable and substantial outfit. One of the most noticeable conditions is the absolute cleanliness of the surroundings, there being practically nothing to indicate that a bleaching plant is in operation.

The plant consists of a bleaching machine, with a capacity of 1,000 lbs., a tank to hold the bleach liquor, a pump for pumping the bleach liquor from the tank to machine, and a tank to hold the hot water for wetting out the cotton when first put into the machine.

This machine was made by the well known firm, the Klauder-Weldon Dyeing Machine Co., of Amsterdam, N. Y., and its description will be of interest.

The tub of machine is lined with heavy sheet copper, which allows the machine to be thoroughly and quickly cleaned after the different processes, and also prevents the wood work from being attacked by the bleaching liquor.

The drum or cylinder is made entirely of bronze and perforated sheet copper. To guard against possibility of rust spots, and to ensure the most perfect results it is absolutely essential that no iron shall enter into the construction of a bleaching apparatus. This machine is therefore ideal in this respect. The material used in its construction makes it very durable. The perforated sheet copper ensures a perfect circulation of the liquor through the material, which is of course necessary to produce a good, clean and thoroughly bleached cotton.

The cylinder is divided into four compartments, and these compartments are filled with the cotton to be bleached. The object of these divisions is to separate the material during the different processes, prevent it from becoming matted and tangled, and de-

liver it in the best possible condition for after operations.

The cotton is wet out, bleached, soured, washed, tinted, and if necessary dyed without being handled or removed from the machine. This makes the process a continuous one, and by which very economical results can be obtained. As one man can attend the machine while in operation, the cost of labor is reduced to a minimum.

The cylinder or working part is enclosed, which confines the steam and also prevents the water, bleach liquor, etc., splashing on the bleach house floor. In this particular instance the tank containing the bleach liquor is located below the level of machine and under the floor. When the bleaching process is finished the liquor is run into this tank and pumped back again as occasion requires. If circumstances would not allow of tank being placed below the floor, it could of course be located above the machine. The location below the floor is preferable in all cases where practicable.

The object of the hot water tank is to save valuable time when wetting out the cotton. On examining the machine it was found that although it had been in use a considerable length of time there was no visible signs of any wear or tear. After looking carefully into the construction it could be seen that every part was made to withstand wear and tear, and that no expense had been spared to make it a perfect machine. Being entirely devoid of intricate or delicate parts the expense and annoyance of break down is practically eliminated.

The machine does its work smoothly and must be a very desirable equipment from the fact that when not in operation on bleach, it can be used as a dyeing machine for either cotton wool or rags.

The plant illustrated was very recently installed and consists of eight 1,000-lb. machines

Experts in this particular line pronounce it one of the very best in the country.

The spinning mule was invented by Samuel Crompton in 1780, when he was twenty-one years old after five years of labor.

THE SCARCITY OF AMERICAN COTTON IN GERMANY.

In a recent report Hugo Muench, U. S. Consul at Plauen refers to the crisis in the German cotton industry caused by the scarcity of American cotton:

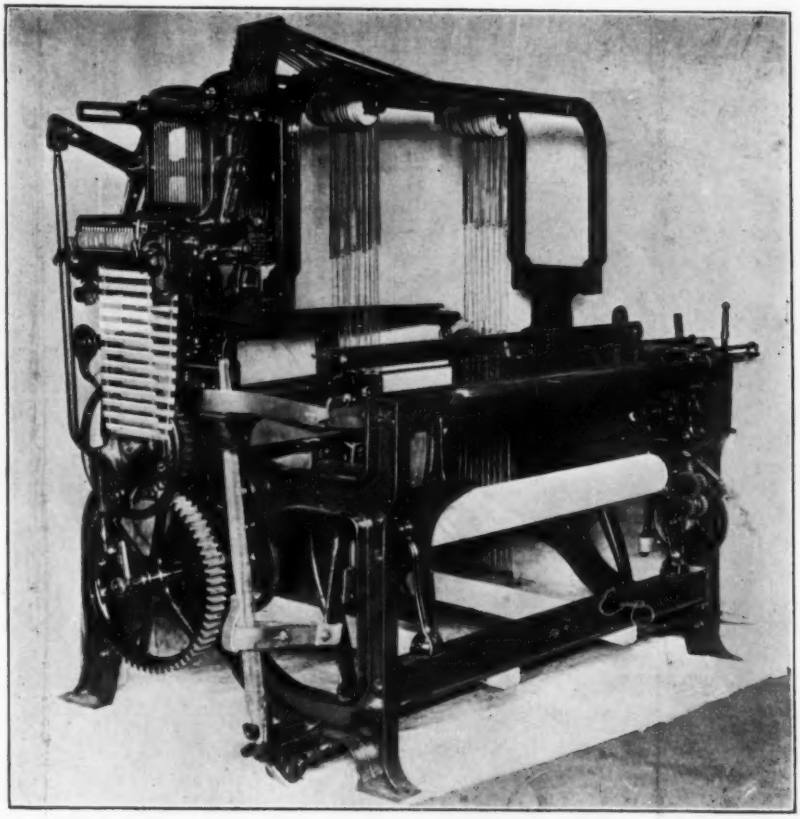
"In all textile districts of Germany in which, as in Plauen, cotton forms a vital part of the requisite raw material, the present violent fluctuations of the American cotton markets produce a condition of agonizing uncertainty in the calculations of the manufacturers. Past accumulations of raw material have been consumed, and any temporary drop in the cotton markets of Liverpool or Bremen is at once seized upon to fill most pressing wants, thus again causing an instant stiffening of prices.

"Interest is growing in all efforts to bring about the emancipation of the European market from its dependence upon the American cotton fields, and Government aid is being hoped for to establish and develop new cotton-growing districts in the colonies of the Empire.

"At a recent public meeting of a union of tradespeople in Berlin these questions were publicly discussed and regrets expressed that the propaganda of the press had, as yet, not aroused that interest which the importance of the question demanded, and that the general public was still too much inclined to view the existing state as a matter affecting a mere branch of Germany's industrial system, when, in fact, it influences the well-being of the entire people. It was urged that the creation of new cotton-growing districts is today the sole means of breaking the bondage in which the United States is alleged to hold the cotton industries of Europe—far more effective than the waging of a tariff war. Regret was also expressed that both the Government of Germany and its legislative council (Reichstag) had so far seemingly ignored the existence of a cotton famine, and the hope was indulged that the unfavorable condition of the coffee trade in Brazil and of the sugar industry in the West Indies would directly stimulate cotton growing in those regions.

A NEW LOOM.

The accompanying illustration represents the Kilburn, Lincoln & Co.'s "Twentieth Century" loom, which is the latest product of their shops in Fall River. It is especially designed for fancy weaving. Like all the looms built by this firm, the "Twentieth Century" retains all the light running and high speed features which have made the Kilburn, Lincoln & Co.'s high speed looms so well known and successful. The new model has been placed on the market in response to the constantly increasing demand for a loom especially adapted to receive the many attachments used in fancy weaving. Such attachments may, of course, be applied to almost any plain loom, but too often it is necessary to make such application in an awkward manner. In designing the "Twentieth Century" this situation was kept constantly in mind and the result is a loom to which may be applied the attachments above referred to in the most workmanlike and practical manner. The advantage claimed by Kilburn, Lincoln & Co. for this loom is that it combines the light running features of their standard pattern loom with the weight of their heavy pattern loom and is adapted for weaving plain goods at the highest practical speed. At the same time it may be converted into a fancy loom, capable of weaving the finest fabrics in the most thorough and workmanlike manner. Thus the same loom may be used in plain cotton weaving, in fancy cotton weaving and at a slight additional expense, may at any time be used in silk weaving.

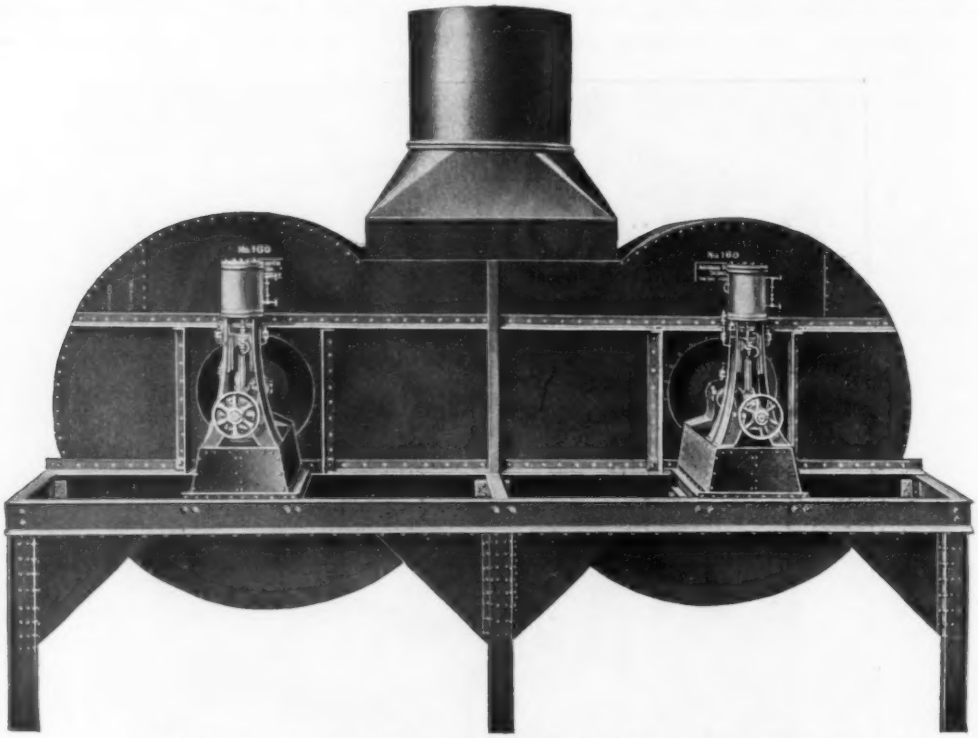


THE "TWENTIETH CENTURY" LOOM. KILBURN, LINCOLN & CO., FALL RIVER, MASS.

A RECENT INDUCED DRAFT INSTALLATION.

As the practical economy and general utility of mechanical draft becomes better understood, it is being more generally adopted in all classes of modern power plants. Every engineer understands the low efficiency and excessive first cost of a high stack, which is gradually being supplanted by the less expensive and more economical fan. The modern hotel with its complex mechanical equipment requires apparatus which will produce strong draft under all weather conditions, with the highest efficiency and without smoke. It is unquestionable that a high stack will produce good draft with favorable weather conditions, but at best it has a very low efficiency, and the smoke nuisance ever present is no small matter for consideration about such buildings. Mechanical draft fulfils every requirement of a stack, and many more, at much less expense.

The accompanying cut represents an induced draft plant recently built by the American Blower Company of Detroit, for the Hotel Royal Poinciana, Palm Beach, Florida, this being the third plant of this character built by that company for the Florida East Coast Hotel Company under the supervision of Mr. Wm. R. Kenan, Jr., Consulting Engineer, of Lockport, N. Y.



AN INDUCED DRAFT PLANT, BUILT BY THE AMERICAN BLOWER CO., DETROIT, MICH.

This apparatus is mounted on a steel platform in the boiler room above the floor, to save floor space, and consists of two fans placed end to end, and both delivering into a 60-inch steel stack, which extends through the roof only twenty-two feet above the fan outlets. Each of these is a hundred and sixty inch fan, with special full housing and a wheel one hundred and eight inches in diameter. They are designed to furnish draft for five seventy-eight inch by eighteen foot horizontal tubular boilers and one seventy-eight inch by twenty foot of same type; the eighteen foot boilers have a grate area of thirty-

nine square feet each, the twenty foot boiler an area of forty-two and one quarter feet. The boilers carry a steam pressure of one hundred and twenty pounds, the fuel being buckwheat anthracite. Each fan is designed for a normal speed of two hundred and fifty revolutions per minute, but can be speeded up to three hundred revolutions per minute and at the maximum speed the two fans will produce sufficient draft to force the boilers fifteen per cent. over their rated capacity. The apparatus is designed for a normal draft of 1.5 inches of water and a maximum pressure of 2 inches. At normal speed each fan handles twenty-two thousand cubic feet of gases per minute at a temperature of five hundred and fifty degrees; under these conditions each fan requires ten brake horse power for its operation.

The fans are operated by the American Blower Company's direct connected high speed vertical engines. These engines have cylinders seven inches in diameter by seven inches stroke, and are of the balanced piston-valve center-crank type. The wheel of each fan is overhung on the end of the engine shaft. The engines have large wearing surfaces and an improved system of lubrication, which permits of long and continuous runs with little attention. The crank shafts are of forged steel and turn in long and well babbitted bearings. To each engine is attached an automatic regulating valve which increases the fan speed and resulting draft as the steam pressure falls and, vice versa, decreases the speed as the pressure rises.

The stack is made of No. 10 sheet steel, and is arranged so as to be self supporting on the outlets of the fans. The steel platform supporting this outfit is built of six vertical eight-inch I-beams with a superstructure of ten-inch and six-inch I-beams.

This plant has given most excellent results and is fairly representative of the latest practice in this very important branch of modern power plant equipment.

THE HOTEL ROYAL POINCIANA, EQUIPPED WITH INDUCED DRAFT BY AMERICAN BLOWER CO., DETROIT, MICH.

Improved Finishing Machine. Fernand Dehaitre, Paris, France, is introducing a new finishing machine which is said to be adapted for both wool and cotton fabrics. The finishing compound is applied first; the cloth is then passed over drying cylinders and reaches an expander sufficiently damp to stretch without injury. A special feature of the machine consists of the passage of the partially dry pieces around a fourth drying cylinder. An endless felt web is pressed against the cloth on this cylinder. The steam generated in the cloth cannot escape but remains in the fabric and causes the fibres to swell, increasing the thickness of the pieces without reducing its width, and imparting a very agreeable feel.

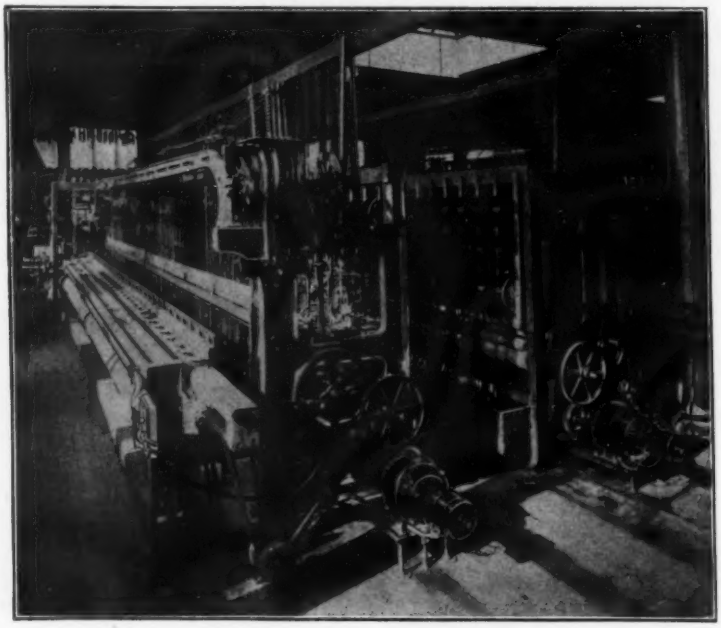
Automatic Loom. Pemberton & Co., Burnley, England, are placing on the market an automatic shuttle changing loom. A loom running at 195 picks per minute is now at work in Manchester. It is said that looms can be run as high as 200 picks per minute if desired.

A copy of an invoice dated 1784 shows that the price of twist yarn in England at that time was $1.54 a pound for No. 30 and $1.60 for No. 31. Cotton varied from 24 cents to 50 cents per pound.

INDIVIDUAL MOTORS FOR TEXTILE MACHINES.

There is probably no class of machines where greater saving in power may be effected by means of individual motor drive than in the case of textile machinery. This is especially true in the case of looms on account of the intermittent character of the operations. The loss of power in line shafting is a constant drain on the motive power. one-half horse power was required to drive the shafting and idle pulleys and the rope drive to this floor, and about twelve horse power additional was required when the looms were all operating under normal conditions.

After the looms were equipped with individual Watson motors they were moved to the seventh floor of the building and placed in such manner as to take advantage of the best light and space without having to place them



A WEAVE ROOM EQUIPPED WITH WATSON INDIVIDUAL MOTORS.

When individual motor drive is used, however, the loss in transmission stops when the loom stops, and the efficiency of the transmission when the loom is running is greater than in the case with belt and shaft drive.

The above is well illustrated by the plant from which the illustrations for this article were made. In this plant there were 45 looms of different makes and types all working on upholstery bindings, rug fringes, etc. Before the motor drive was put in these looms were all on the fifth floor of the building and were driven from an engine in the basement by means of a vertical rope drive to the fifth floor, where the power was distributed to the looms by shafting and belts. Seventeen and so that they could be reached by line shaft. With all the looms in normal operation the entire amount of power used on this floor, including all transmission losses, was eight and one-half horse power.

In addition to the saving on power in this case there was a considerable saving in the cost of the building, as the extra height from floor to ceiling, which would have been required in case shafting had been used, was not needed.

The decrease in material spoiled by grease from the line shaft and belting was particularly spoken of by the owners of the plant, and the greater cleanliness of the motor drive is strikingly shown by the fact that the

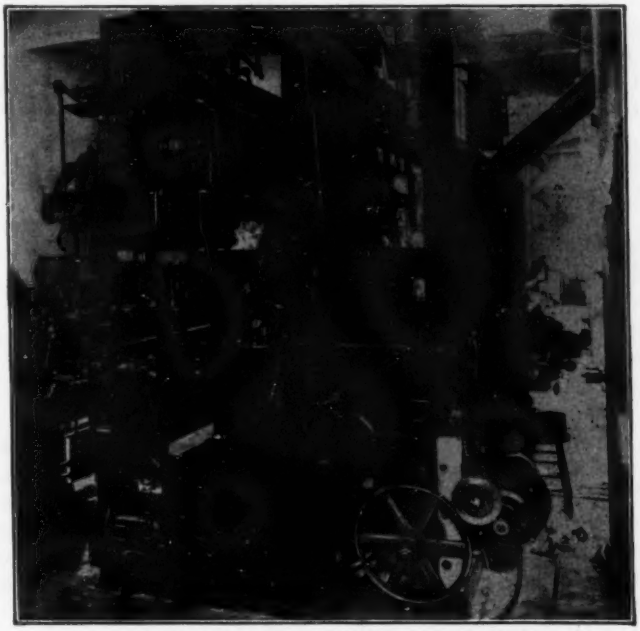
ceiling which was painted white six months ago is still white, while on some of the other floors where the belting and shafting is being run, the ceilings are black and greasy.

Another great saving is in the time which was wasted in case of broken belts and trouble with shafting, one man being able to look after the running repairs on the looms where it had formerly required two.

The motor equipment consists of a specially wound motor geared direct to the driving gear of the loom and operated by a switch connected to the operating bar which runs across the face of the loom. The motor is provided with a magnetic brake which stops the loom instantly when the current is cut off and enables the operator to move the lay a quarter of an inch at a time, if desired. The brake being mounted on the motor shaft, there is no tendency to spring the shaft as is the case where the friction brake on the belt pulley is used. Being operated by the current from the motor there is no chance for the brake to become operative while the motor is running.

These equipments with some modifications are also used in silk ribbon looms, broad silk looms and netting looms and in all cases the use of individual motor drive has increased the output and cut down the power and maintenance cost.

This installation and the others referred to were made by the Mechanical Appliance Co. of Milwaukee, Wis., manufacturers of the Watson "Textile" Motor. This company has paid special attention to textile work.



A LOOM DRIVEN BY THE WATSON INDIVIDUAL MOTOR.

Heating Apparatus for Dye Vats. Royles, Ltd., Irlam, England, have brought out a new arrangement for heating dye vats and bleaching kiers. The steam is passed through each tube separately and then passes into the open air. A high efficiency is maintained. This method is said to be much better than the open jet through which live steam is blown into the liquor.

In 1822 when the foundation of the first cotton mill was laid in Lowell, Mass., the population of the town did not exceed one hundred. There are now over forty mills within the city limits and the population numbers about 80 thousand.

MEMOIRS OF A VETERAN MASTER MECHANIC.

BY EBEN GOULD.

(Continued from April.)

The looms put in during Mr. Dewso's time were broad width made by the Crompton Loom Works in Worcester, Mass. At the time I first went to the mills the looms were all the old style narrow looms. In the course of time, the No. 3 weaving room was fitted with broad looms. In the fall of 1866, Bill Blatter came there as boss weaver over all the weaving rooms. Some of the loom fixers had never worked on any except the old narrow looms, and were not quite up with the times on broad looms. Quite often a loom would get out of place and they could not set it so that it would work right. At such times, they would send for me to come and help them. Soon after Blatter came one of the looms got out of order and kept throwing out the shuttle. Blatter told the fixer not to send for me, but to fix it themselves. So they kept bothering away for several days. Then Blatter told the fixer to go for the machinist. I followed him and when I came to the loom, I could not but wonder if Boss Blatter and his fixers were all blind and could not see where the trouble was. The most simple and common cause of a loom throwing the shuttle was in full sight. I said to the fixer: "Get your level and level up the shuttle boxes."

"Oh!" he said, "that is not where the trouble is. I set them that way to keep the shuttles from flying out."

"Well," I said, "if you know where the trouble is you better fix the loom yourself. I can't see any other fault as long as the boxes are in that shape, it would make me crazy to work on any other part of the loom with those boxes cocked up like that. I must level them before I can fix any other part."

I took the level and found the boxes were about 7/8 of an inch out of level, the end towards the race plate being that much lower than the back or outside end. We got them into proper shape and started the loom to weaving. It went O. K. Not a shuttle went wrong, but the fixer looked rather foolish when I asked him what he thought made the shuttles fly out.

The fault was all in the fixer. The loom was all right, but probably some broken thread in the warp caused a snarl that caught the point of the shuttle and turned it from entering the opposite box, and the more he fixed the worse it went. What sticks me is to think that a boss weaver and several fixers should bother for several days about a loom with a box 7/8 of an inch out of level.

I was not acquainted at that time with Boss Blatter. He had not been there many days, and this affair was the first occasion for my speaking with him. I think his stay at the mills was less than a year. Shortly before he left, he came to the shop and asked if I was any relation of the Gould at the American Mills, in Rockville, Conn.

"He is my brother," I said.

Then he asked me if I knew anything about laying out stock for making different kinds of cloth; how much of each kind was wanted to make a given number of yards. I told him I did know a little about it, but not enough to go into that branch of the business. However, he wanted me to show him all I did know about it, which I did. What was my surprise when a short time after he left these mills to hear that he had gone to a woolen factory in Worcester county as superintendent. I afterwards heard that he became very wealthy.

If a shuttle box is much lower at the end towards the race-way the shuttle as it is driven from the box will strike down on the race place so hard that it will bound up into the warp and away it will go across the room. I once knew a weaver who was in the act of stooping for a bobbin of filling, when a shuttle from the next loom flew out and struck him in his right eye, destroying the sight entirely.

In Mr. Dewso's time I used to be called to all parts of the mill, from picker to finishing room, to assist the overseers in keeping their machinery in order. For many years I even did all the shear grinding and kept the other finishing machinery in repair.

In the time of Mr. Dewso and Richard Dinkle as agents, Charles Caudle, now of Providence, was boss finisher. He was the

best finisher ever employed at the mills while I was there. I had less to do with the finishing machinery while he was there than with any other finisher ever employed at the mills.

During my time in June of 1867, I received word from Silas Shobob of Hidetown, asking me to come to his mill and see if I could tell what the trouble was with his engine, as the bearing of the balance wheel shaft heated so that they were obliged to shut down. This was my first acquaintance with Mr. Shobob. I went to their mill and he took me to the engine room. As we were passing through an adjoining room, I saw a man in the act of scouring a large composition shell of what appeared to be the cap of the main journal of an engine shaft. I said to Mr. Shobob:

"Stop here a minute, is not that the shell of your engine box?"

"Yes," he replied.

"Well," I said, "I do not need to look further for the trouble. This man is scouring that box with emery cloth and it is full of blowholes and the emery gets into them and makes the bearing run hot. Emery should never be used on a bearing of any kind, much less on an engine shaft. It is never used where they build engines."

At this the man who was scouring the box appeared quite angry. He was the engineer and said he guessed he knew the engine and other bearings were always finished with emery.

Then we went into the engine room and on looking at the bearings found that they had been using emery mixed with oil to lubricate the main journals. They were badly scored and the spaces around the boxes were full of emery.

I told Mr. Shobob that the engine never would run without heating. We worked all night cleaning the bearings, but never after could the engine be run without heating. For several years it was run by leaving the cap off and having a stream of water running on the bearing about all the time the engine was running.

Several years later the mills were burned and that was the last engine I ever heard of that was lubricated with emery. Now Mr. Shobob did not claim to know anything in regard to the use of emery, so he took no part in the controversy between his engineer and myself. Several weeks later I met Mr. Shobob on the street in Hidetown. He spoke to me, and at the same time taking a ten dollar bill from his pocket, placed it in my hand and said:

"Take that and go on a good time on the Fourth of July. I guess it is worth that to learn not to use emery for oiling an engine."

"Are you satisfied with what I said in regard to it?" I asked.

"I sent to Taunton for the man from whom I bought the engine to come and see it, and he said just as you did, that emery was never used on an engine bearing."

I never heard what became of that engineer but he certainly was the first and last man I ever saw using fine meal emery for lubricating an engine shaft.

In 1865, during Mr. Dewso's time, they bought from some parties in Worcester, what was called a chinchilla machine for the purpose of rolling the nap into nubs on the face of heavy goods. This was the first machine for that purpose I had ever seen. It was a rather crude affair. The movable disc for rolling the nap was much heavier and wider than the machines made several years later. Four adjustable legs, one at each corner, stood on four stud plates. There was no contrivance for holding the disc down so as to keep it from rocking as it was whirled rapidly around by the eccentrics. It would rock about, and although it would make the nubs, they did not stand straight on the face of the goods, but would look as if they had been pounded down. Some leaned to the right, while those near the other side would lean to the left.

The boss gigger had never seen such a machine and would not have anything to do with it. I had to set the machine in place and connect the power to drive it, there being no one at work in the mill that had ever run one of these machines. Mr. Dewso said he wished that I would try and get it at work, and for several years I had to do all the nubbing of goods done in that mill.

(To be continued.)

The first cotton mill in Fall River was erected in 1812.

MEMOIRS OF A VETERAN MASTER MECHANIC.

BY EBEN GOULD.

(Continued from April.)

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"Well," I said, "if you know where the trouble is you better fix the loom yourself. I can't see any other fault as long as the boxes are in that shape, it would make me crazy to work on any other part of the loom with those boxes cocked up like that. I must level them before I can fix any other part."

I took the level and found the boxes were about 7/8 of an inch out of level, the end towards the race plate being that much lower than the back or outside end. We got them into proper shape and started the loom to weaving. It went O. K. Not a shuttle went wrong, but the fixer looked rather foolish when I asked him what he thought made the shuttles fly out.

The fault was all in the fixer. The loom was all right, but probably some broken thread in the warp caused a snarl that caught the point of the shuttle and turned it from entering the opposite box, and the more he fixed the worse it went. What sticks me is to think that a boss weaver and several fixers should bother for several days about a loom with a box 7/8 of an inch out of level.

I was not acquainted at that time with Boss Blatter. He had not been there many days, and this affair was the first occasion for my speaking with him. I think his stay at the mills was less than a year. Shortly before he left, he came to the shop and asked if I was any relation of the Gould at the American Mills, in Rockville, Conn.

"He is my brother," I said.

Then he asked me if I knew anything about laying out stock for making different kinds of cloth; how much of each kind was wanted to make a given number of yards. I told him I did know a little about it, but not enough to go into that branch of the business. However, he wanted me to show him all I did know about it, which I did. What was my surprise when a short time after he left these mills to hear that he had gone to a woolen factory in Worcester county as superintendent. I afterwards heard that he became very wealthy.

If a shuttle box is much lower at the end towards the race-way the shuttle as it is driven from the box will strike down on the race place so hard that it will bound up into the warp and away it will go across the room. I once knew a weaver who was in the act of stooping for a bobbin of filling, when a shuttle from the next loom flew out and struck him in his right eye, destroying the sight entirely.

In Mr. Dewso's time I used to be called to all parts of the mill, from picker to finishing room, to assist the overseers in keeping their machinery in order. For many years I even did all the shear grinding and kept the other finishing machinery in repair.

In the time of Mr. Dewso and Richard Dinkle as agents, Charles Caudle, now of Providence, was boss finisher. He was the

best finisher ever employed at the mills while I was there. I had less to do with the finishing machinery while he was there than with any other finisher ever employed at the mills.

During my time in June of 1867, I received word from Silas Shobob of Hidetown, asking me to come to his mill and see if I could tell what the trouble was with his engine, as the bearing of the balance wheel shaft heated so that they were obliged to shut down. This was my first acquaintance with Mr. Shobob. I went to their mill and he took me to the engine room. As we were passing through an adjoining room, I saw a man in the act of scouring a large composition shell of what appeared to be the cap of the main journal of an engine shaft. I said to Mr. Shobob:

"Stop here a minute, is not that the shell of your engine box?"

"Yes," he replied.

"Well," I said, "I do not need to look further for the trouble. This man is scouring that box with emery cloth and it is full of blowholes and the emery gets into them and makes the bearing run hot. Emery should never be used on a bearing of any kind, much less on an engine shaft. It is never used where they build engines."

At this the man who was scouring the box appeared quite angry. He was the engineer and said he guessed he knew the engine and other bearings were always finished with emery.

Then we went into the engine room and on looking at the bearings found that they had been using emery mixed with oil to lubricate the main journals. They were badly scored and the spaces around the boxes were full of emery.

I told Mr. Shobob that the engine never would run without heating. We worked all night cleaning the bearings, but never after could the engine be run without heating. For several years it was run by leaving the cap off and having a stream of water running on the bearing about all the time the engine was running.

Several years later the mills were burned and that was the last engine I ever heard of that was lubricated with emery. Now Mr. Shobob did not claim to know anything in regard to the use of emery, so he took no part in the controversy between his engineer and myself. Several weeks later I met Mr. Shobob on the street in Hidetown. He spoke to me, and at the same time taking a ten dollar bill from his pocket, placed it in my hand and said:

"Take that and go on a good time on the Fourth of July. I guess it is worth that to learn not to use emery for oiling an engine."

"Are you satisfied with what I said in regard to it?" I asked.

"I sent to Taunton for the man from whom I bought the engine to come and see it, and he said just as you did, that emery was never used on an engine bearing."

I never heard what became of that engineer but he certainly was the first and last man I ever saw using fine meal emery for lubricating an engine shaft.

In 1865, during Mr. Dewso's time, they bought from some parties in Worcester, what was called a chinchilla machine for the purpose of rolling the nap into nubs on the face of heavy goods. This was the first machine for that purpose I had ever seen. It was a rather crude affair. The movable disc for rolling the nap was much heavier and wider than the machines made several years later. Four adjustable legs, one at each corner, stood on four stud plates. There was no contrivance for holding the disc down so as to keep it from rocking as it was whirled rapidly around by the eccentrics. It would rock about, and although it would make the nubs, they did not stand straight on the face of the goods, but would look as if they had been pounded down. Some leaned to the right, while those near the other side would lean to the left.

The boss gigger had never seen such a machine and would not have anything to do with it. I had to set the machine in place and connect the power to drive it, there being no one at work in the mill that had ever run one of these machines. Mr. Dewso said he wished that I would try and get it at work, and for several years I had to do all the nubbing of goods done in that mill.

(To be continued.)

The first cotton mill in Fall River was erected in 1812.

Dyeing, Bleaching, Printing, Etc.

NON-CROCKING SILK VELVETS.

LOUIS J. MATOS, Chemical Engineer.

The problem of manufacturing silk velvets that will stand the test of rubbing is one of great importance, and requires from the dyer of such goods the most painstaking care in every detail. The class of goods that this test is applied to is known to the trade as "collar velvets," and to meet the demands of the discriminating buyer, the manufacturer is frequently at his wits ends to supply an article that will meet the terms of the guarantee that he must always give.

Recourse to this and that dye on the part of the dyer has in many instances been the cause of much trouble. Being led from one product to another in the hope of finding one that would not crock and yet give the proper depth of shade and color, has to a great extent obscured the fact that the remedy existed, not so much in the dyestuff employed, but rather in the process of dyeing.

All black velvets are not dyed by one process, there being a number of methods for dyeing these goods, but there is only one basic process that, with modifications within limits, yields the results demanded of a velvet for coat collars.

The proper process for dyeing silk for collar velvet is to dye in the skein, taking extra care in boiling-off, and in giving a thorough washing afterwards with water. Neglect of these two points is very likely to spoil all the other results, no matter how carefully carried out—the main object being to keep the silk at all times free from soap, soap oils or softening or lustering compositions made in whole or part with oils.

Dye the clean net silk upon an iron bottom, using nitrate of iron and fix with sal soda; under no circumstances use more iron than is necessary to bring the weight of the silk up to a 16-ounce black. Overweighting for collar velvets is a mistake. When the proper amount of oxide of iron has been fixed on the silk, rinse well, and enter a bath made up with yellow prussiate of potash and hydrochloric acid, this latter being added in several proportions. This part of the preparatory process is a delicate one, being the well-known "blue dyeing" of the black silk dyer, and only sufficient prussiate should be used to convert the iron on the silk into the insoluble blue prussiate. Wash well, or as long as no blue is seen in the rinse water, and then work in a gambir or cutch bath for an hour or two, according to the resulting shade desired. Lift, wash, and dye in the logwood or hematine bath, the formula for which is given below If a blue-black is desired, extract of fustic is left out, but for jet blacks its use is necessary.

A second dye bath made up with the same amount of pure logwood or its equivalent, as in the first bath, is generally used so as to give the necessary bloom to the shade.

The following quantities may be used as a guide in dyeing skein silk for collar velvets.

Mordant the boiled-off silk by giving three passages of one-half hour each through a bath of nitrate of iron standing at 15 degrees Tw., and fixing after each passage by working in a warm bath of sal soda for half an hour at 125 degrees F. Wash well. Each iron treatment will add about 4 per cent. to the net weight of the silk.

The prussiate bath is made by dissolving 10 per cent. of yellow prussiate, calculated on the weight of oxide of iron fixed on the silk, with an equal weight of hydrochloric acid. This bath is heated to 85 degrees F., when the silk is entered and given six to eight turns; increase the heat to 120 degrees F., add the remaining half portion of the acid, increase the temperature to 140 degrees F., lift, wring out and wash. These details are necessary to observe, for the proper fixation of the blue decides whether the dyed silk will crock. If it does crock, the trouble may be safely located in this process, but vigilance here does not absolve the dyer from using every care at other parts of the dyeing process.

From the blue bath, enter the silk in a bath

of gambir at 70 degrees Tw., heat to 125 degrees F., work for one hour, and dye with:

Logwood extract (paste) 15 pounds
Fustic extract (paste) .... 5 pounds
Copperas ..... 5 pounds
Acetate of copper .... 2½ pounds

Keep for one-half hour at 150 degrees F., then raise to 160 degrees F., and work through a supplementary dye bath containing:

Logwood extract (paste) 10 pounds

giving the same time and handling as for the first bath. Lift, wash well and finish by giving a run through a tartaric acid bath. Leave out all oil finishes.

A bluer shade may be given to the black, by working the silk in an alum bath after the gambir treatment.

Some dyers give a blue overcast to logwood blacks by topping with the Alkali Blues, but owing to their method of application results fast to crocking cannot be assured.

DEXTRINE.

To the printer and finisher of textile fabrics dextrine is one of the most useful products and is consumed in very large quantities. As used by the textile printer or color mixer, its chief use is to serve as a thickener for the various colors, while to the finisher, it serves to give body to the fabrics being treated, and in some instances to act as a carrier for weighting materials such as china clay, etc.

The name dextrine is very frequently used as the synonym for British gum, and although there is a similarity between the two products from a chemical standpoint, yet there is a vast difference in their deportment when used in practice, and this will be made plain when the manufacturing process is considered.

Dextrine is made from starch, any kind of starch will answer, but as a rule corn starch, wheat starch, or potato starch is given the preference. The starch is either wasted by evenly heated furnaces, or by a special acid treatment. The common process is to convert the starch into dextrine by furnace heat, and the uniform control of the heating operation, determines the value of the resulting product, for unless the temperature of the roasting is regular, there will be varying quantities of unchanged starch, which, of course, are not soluble, and the greater the degree of solubility of a given sample of dextrine, the greater its value.

Dextrine may be found on the market in all shades, ranging from almost white to a dark brown, and are the result of different times and temperatures in roasting—the longer the time and the higher the temperature, the darker the gum. Different kinds of starches yield different gums, and it is safe for the user to assume that, though two different samples of dextrine appear to be the same, yet they may behave in a directly opposite manner. A gum maker who is thoroughly familiar with the roasting quantities of the several starches, can make suitable mixtures of two or more starches, and produce a dextrine having certain definite ingredients as to solubility, color, etc.

The dark dextrines have the least unchanged starch and consequently are the most soluble. Such dextrines when made into a thickened solution are the least likely to become pasty-thick on standing, a peculiar characteristic of the white dextrines or British gums proper, a commercial grade that always carries a large quantity of unchanged starch.

The best general grade of dextrine should be completely soluble in warm water, or at least, show but a very slight insoluble residue, to be of a light to medium buff shade, and to be somewhat dense and hold its form when pressed by the hand. The usual test for free or uncombined starch is with a drop of iodine solution, which will immediately show the presence of starch by the blue discoloration, but this test has little value other than as an index. The best course to pursue is to have an analysis made, or to make practical tests with several grades of dextrine, setting the one which gives the best results aside as a check sample for all future deliveries.

Dextrines should be free from any acid. There are instances where the acid in the dextrine has been the cause of altered shades, consequently all dextrines that are to be used

for thickening colors, should be as free from acid as it is possible to make them.

In many mills using print colors, dextrine is used as the thickener for the solution of the color, usually as thick as ordinary syrup, while the actual thickener for the printing paste, is flour, starch, or gum tragacanth. The dextrine solution as first made is prepared by boiling 50 pounds of the dextrine in 6 gallons of water until the solution is complete, this will yield 100 pounds of "gum water, 1 to 1," and is a universal standard. If made in larger quantities, and likely to be kept for several days, a few ounces of salicylic acid should be added as a preservative.

Dextrine when first made in solution is capable of being mixed in all proportions with other thickening agents, even in the presence of relatively large amounts of acids, such as oxalic or acetic acids.

When dextrine is used as a carrier or thickener for colors to be used in fine detail printing such as tracery or lace work, it should be double strained, to ensure the removal of fine particles of metal that are likely to be present, and which, unless removed, might injure the printing rollers.

For sizing and finishing purposes, dextrine has few competitors, and though it may be substituted to some extent with starch or other stiffening agents, yet it is always used in small quantities to mix with the main portion of the size. For high class fabrics, dextrine is largely used in conjunction with gum tragacanth and soap to impart a heavy "leathery" feel that is so much desired, especially for plushes.

For carrying large quantities of color, such as would be required in "tipping" seal plushes, etc., the white British gum is used for the reason that it makes a very smooth working paste, and one capable of standing a reasonable amount of nitrate of iron, and free mineral acids.

COMMERCIAL SOURCES OF TANNINS.

The importance of tannic acid in dyeing is widely recognized, and although chemists have tried for many years to produce a substitute for it, all attempts have so far failed. In the art of dyeing, the value of tannic acid depends upon its ready absorption by all vegetable fibres and silk and while so absorbed retains its properties of precipitating upon the fibres certain metallic salts that are brought in contact with it, thus producing certain metallic tannates that serve as the true mordant for the basic colors.

By the general term "tannins" is meant a group of closely allied substances of vegetable origin that possess the properties of tannic acid, which latter is the standard with which all others are compared. Pure tannic acid—di-gallic acid—is now an article of commerce, being manufactured on a large scale, and from the standpoint of the dyer is much to be preferred to the general line of "tannin extracts" on account of its entire freedom from coloring and resinous matters. When used as a mordant for basic colors, the shades show up very much brighter than if they are dyed upon a mordant of sumac extract or other substance. Commercial tannic acid is of a light buff to brown color, easily soluble in water, and very much more convenient to handle than any other form of tannin. In comparison with a pure sumac extract with 18 per cent. of tannic acid, 100 pounds of the commercial acid is equal to over 550 pounds of extract, but as an absolutely colorless extract is difficult to obtain the advantages are even greater.

The purest and least colored tannic acids are to be obtained only from sumac or nut galls. Different grades may be obtained from other sources, but their use is not extensive.

The most important source of tannic acid is from galls or nut-galls, the irregular shaped, rounded excrescences found on various kinds of oak trees, the result of a sting of the female gall wasp, which insect deposits its eggs in the shoots or young branches of the tree. The galls gradually form, and become greenish or bluish in color when the amount of tannic acid is at its maximum. When the color gradually changes to a yellowish color, the tannic acid has lessened in quantity due to changes in its composition. The best galls should always be selected when they are firm and of a greenish-blue color, and preferably before the insect inside has escaped. It is a trick of the gall collectors and

native merchants to plug the insect holes in the galls with wax, as whole and perfect galls always command a higher price than punctured ones.

Nut-galls are found in Persia and the Levant, Symrna, and Turkey. Persia produces the best grades, and including the above mentioned countries the average yield in tannic acid is above 55 per cent. Inferior qualities are obtained from France, Italy, Austria and Germany. Galls also come from China and Japan, but not from the oak tree nor from the sting of a wasp, but are found on a variety of sumac, the sting being made by a certain plant louse. The oriental galls are easily distinguished from the other kinds by being very irregular in shape, light in weight, hollow, and containing on an average over 70 per cent. of tannic acid. The manufactured product from galls is an extract containing about 50 per cent. of tannic acid. It is highly esteemed for silk weighting, and is free from certain impurities that are always unavoidably present in other tannic extracts. As a rule gall extract, though somewhat colored, gives no color to cotton or silk during mordanting, and in consequence is highly esteemed.

Next to galls in importance, but of greater consumption is sumac, the leaves and twigs of certain species of the rhus family common to certain districts of Virginia, and grown on large areas in Greece, Spain, Italy, including the island of Sicily, Sicilian sumac being the generally accepted standard with which nearly all others are compared. The average good grades run from 15 to 18 per cent. of tannic acid while these figures are often exceeded during good seasons of growth. Commercial sumac is the ground leaves, etc., and should always be purchased upon its content of tannic acid. Sumac extract is too well known to require attention except to mention that many improvements have been made during recent years with the result that dry extracts are now to be purchased in the market that possess none of the disadvantages of the thick extracts. These dry extracts are the result of careful treatment whereby all the resinous, and nearly all the coloring matters are removed so that the finished product will keep in any climate, and under all conditions without caking or running together. "Sumac crystals" is a name given to a highly refined, dried and coarsely ground sumac extract of superior quality available for the finest class of dyeing, and now receiving much attention from dyers It is needless to observe that it is not a real crystalline substance.

Cutch or catechu (known to many dyers as terra japonica) is a most valuable assistant in the dyeing of fast browns upon cotton, but like other natural coloring matters will in a short time be forced aside to make way for the sulphur browns, which even now are used in considerable quantities in place of it. Cutch of commerce is a nearly dry extract of wood and fruit of the acacia catechu, a tree common to India, and also from the betel nut, obtained from the areca catechu, a kind of palm. The use of cutch in cotton dyeing is familiar to all. Another use for cutch is in the weighting of silks that are to be dyed black with logwood upon a mordant of iron. After the silk is loaded with iron as previously determined according to the needs of the case, the iron oxide is fixed by first treating with yellow prussiate of potash followed by a passage through a bath of cutch. Besides fixing the iron the cutch imparts fullness to the fibres.

Mat cutch varies considerably in quality. Very frequently the "mats" contain stones, balls of clay and other adulterants that are never found until they are discovered by the dyer at the time of making his solutions.

Gambir is closely allied to cutch, and is very frequently mistaken for it by persons who are not familiar with either. In general, it is of a more yellow color than cutch, is slightly less soluble in cold water, but equally so in hot water. Commercial gambir is in two forms, cubical blocks about 1 1/2 inches in size somewhat clay colored, and in bales about one foot thick, wrapped in burlap, and when cut open the contents are soft and of a very pleasant odor. Extract of gambir whether cubical or bale, is the dried extract of the leaves of an Indian shrub known to botanists as the uncaria dasyoneura.

Gambir is much used in silk dyeing, being

employed for the same purposes as cutch. As a matter of experience, there is but little to choose between the two products.

To distinguish cutch from gambir: Dissolve a small sample about the size of a marble in one ounce of water, and then add about two ounces of benzol (coal tar benzol) and shake well. The water and the benzol will not mix, but if the sample is gambir, the benzol will show a more or less distinct fluorescence which will not be apparent if the substance examined is cutch.

Mimosa bark. As a source of tannic acid that is at the present time quite undeveloped the several species of acacia found in immense quantities in Australia are of more than passing interest, because there is no doubt but this raw material will be in greater demand than is at present contemplated. Wherever used, mimosa (or wattle bark as it is also called) has more than paid the consumer for the time and money spent in experiments.

Mimosa bark is rich in tannic acid, and an extract made from it is equal in every way to the best grades of sumac extract for the tanning of leather and the dyeing of both silk and cotton. Many dyers to whom this product has been brought have not taken it up in their work, but it is only a question of time when its good qualities will be more generally recognized.

Quelracho. This is a South American product, being a very rich tannin extract from several kinds of hard wood trees common to Central and South American countries, where its good qualities have been long recognized by the native tanners. In this country, however, the tanneries have only taken it up in any quantity during the past few years, and the dyers only very recently. Silk may be dyed with it in the same manner as cutch or gambir would be used, and if upon a prussiate ground, the natural red color of the quelracho will offset the greenness of the former to good advantage.

While mimosa bark extract and quelracho extract are used in the United States to some extent, their consumption is out of proportion to the field they ought to occupy, and it is to be safely asserted that when once their good qualities are recognized it will require a long time to displace them.

BLEACHING COTTON AND WOOL.

Bleaching of cotton and wool mixed goods is possible with a solution of bisulphite of soda in the presence of a sufficient quantity of sulphuric acid to liberate the active sulphurous acid, which is the active bleaching agent in this case.

Owing to the fact that cotton is so much more easily tendered by the action of sulphur in any form than wool, to bleach the wool in a cotton-wool mixture to any degree of whiteness would require so much time that when the wool had been sufficiently bleached the cotton would be worthless.

By adding zinc dust to a commercial solution of bisulphate of soda diluted with four times its volume of water, until no further reaction takes place, then adding milk of lime to precipitate the dissolved zinc, the clear liquid will stand at about 3 1/2 degrees Tw., more or less. This solution is an active bleaching agent for both cotton and wool, and no doubt can be used commercially for this purpose, as its efficiency is well known on a moderate scale. The goods should be worked regularly so that the action of the bleach will be uniform. It only needs replenishing by the addition of fresh solution to keep up the strength. When the bleaching has progressed sufficiently, the goods should be given a thorough wash in clean water, and afterwards with a weak soda wash to destroy any remaining traces of acid.

Anhydrous sulphurous acid in pure liquid form and at a reasonable price is readily to be obtained. This is an ideal bleaching agent for textiles, and it is believed that with a suitable absorbing tank it could be made of practical use.

The ideal bleach for all textiles, however, is either the peroxide of hydrogen or peroxide of sodium, as by this means a permanent bleach is secured, and without any fear of tendering the goods.

Color Cards.

Diaminogene Sky Blue; Cassella Color Co., 182 Front St., New York City.

Ten samples of cotton yarn, four of sateen and four of raw cotton dyed with different percentages of Diaminogene Sky Blue N, N B, N A, and 3 R N.

Benzo Green C; Farbenfabriken of Elberfeld Co., 40 Stone St., New York City.

This card shows two samples of cotton yarn and one of silk and wool cloth dyed with Benzo Green C.

Immedial Brown; Cassella Color Co., 182 Front St., New York City.

This is in reality a hand book of dyeing with Immedial Brown. It contains not only a large collection of samples with the usual formulas, but also much valuable information on the nature of dyes and the best methods of handling the raw stock, yarn and pieces.

Woven Patterns; Berlin Aniline Works, 213 Water St., New York City.

A booklet containing twelve samples of cotton piece goods woven with yarns of different colors dyed fast to washing and light.

Solamine Blue F F; Berlin Aniline Works, 213 Water St., New York City.

Twenty-four shades on cotton, artificial silk and plush dyed with Solamine Blue F F alone and in combination with other colors.

Eboli Blue 4B; C. Bischoff & Co., 88 Park Place, New York.

Two samples of raw stock, two of cotton yarn and two of cotton piece goods dyed different shades with Eboli Blue 4B.

Color Combinations on Woolen Cloth; H. A. Metz & Co., 122 Hudson St., New York City.

This sample card should be in the possession of every wool dyer. Beside each sample of the combination shade are placed samples showing the individual shades forming the combination. The percentage of each color is given and the shades range from light drab to very dark blue.

Shades on Cotton Cloth; Read Holliday & Sons, Ltd., 7 Platt St., New York City.

This is one of the latest cards issued by this well known firm of dyestuff manufacturers. It shows 72 shades of cotton cloth including a wide range of colors for which full dyeing directions are given.

DYE RECIPES.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD RECORD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16-page pamphlet, in convenient form for preservation Subscription price for the Dyers' Supplement $1.00 per year

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Recipe No. 65.

Brown on Worsted Yarn.

Compound Shade on 100 lbs. of worsted yarn. Prepare the dye bath with

3 lbs. Domingo Alizarine Brown G.
½ lb. Domingo Alizarine Claret.
½ lb. Domingo Alizarine Yellow D.
(C. Bischoff & Co., 88 Park Place, New York.)
10 lbs. Glauber's Salt.
5 lbs. Acetic Acid.

Enter yarn at 140° F., bring to a boil and dye at a boil from one-half to three-quarters of an hour, and then add sufficient sulphuric acid,

2 to 4 lbs. Sulphuric Acid,

to exhaust the dye bath.

When the dye bath is exhausted add

2 lbs. Potassium Bichromate,

and boil one-half to three-quarters of an hour longer.

The shade produced in this way is extremely fast to sunlight, fulling, acid, alkali, decatizing and stoving.

Recipe No. 66.

Red on Cotton Yarn.

Bordeaux Y on 100 lbs. of cotton yarn. Prepare the dye bath with

3 lbs. Bordeaux Y.
(Edwin M. Thayer & Co., 106-112 Broad St., Boston.)
20 lbs. Common Salt.

Enter yarn at boil and dye at boil for one hour. Bordeaux Y dyes very level and is particularly useful for shading purposes.

Recipe No. 67.

Black on Cotton Yarn.

Sulphur Black A Extra on 100 lbs. of cotton yarn. Prepare the dye bath with

9 lbs. Sulphur Black A Extra.
(Berlin Aniline Works, 213, 215 Water St., New York.)
35 lbs. Sodium Sulphide Crystals.
5 lbs. Soda Ash.
70 lbs. Common Salt.

Enter at a boil and dye for about one hour, keeping the temperature between 195° F. and a boil. It is beneficial to keep the yarn below the surface as much as possible.

Sulphur Black A E possesses excellent coloring power, and like the other sulphur blacks, is extremely fast to light, washing and acid.

Recipe No. 68.

Blue on Cotton Yarn.

Diaminogene Sky Blue N Pat. on 100 lbs. of cotton yarn. Prepare dye bath with

1½ lbs. Diaminogene Sky Blue N Pat.
(Cassella Color Co., 182 Front St., New York.)
1 lb. Soda Ash.
20 lbs. Glauber's Salt.

Enter the yarn at 170° F. Dye at a boil for one hour. Diazotize in a bath made up with

1½ lbs. Sodium Nitrite,
5 lbs. Hydrochloric Acid, 32° Tw.,

for twenty minutes at a low temperature, rinse and develop in a bath made up with

½ lb. Beta Naphthol,
½ lb. Caustic Soda Solution, 77° Tw.,

for fifteen to twenty minutes at a low temperature, then wash and dry.

Diaminogene Sky Blue N Pat. will be found particularly fast to light, equaling indigo in this respect. It also possesses excellent fastness to washing, milling and cross dyeing.

Recipe No. 69.

Blue on Cotton Yarn.

Tetrazo Sulphur Indigo on 100 lbs. cotton yarn. Prepare the dye bath with

7 lbs. Tetrazo Sulphur Indigo.
(New York & Boston Dyewood Co., 156 William St., New York.)
30 lbs. Sodium Sulphide Crystals.
7 lbs. Soda Ash.
50 lbs. Common Salt.
3 lbs. Mineral Oil.

Dye one hour at a boil, rinse quickly in cold water and then wash thoroughly.

Tetrazo Sulphur Indigo is exceptionally fast to light, washing, fulling and cross dyeing.

Recipe No. 70.

Yellow on Cotton Yarn.

Chlorazol Yellow 3 G on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Chlorazol Yellow 3 G.
(Read, Holliday & Sons, Ltd., 7 Platt St., New York City.)
10 lbs. Common Salt.
200 gallons Water.

Enter the goods below the boil, raise to a boil and dye for one-half to one hour, according to the depth of shade required.

Recipe No. 71.

Blue on Worsted Yarn.

Neutral Blue R on 100 lbs. of worsted yarn. Prepare the dye bath with

2 lbs. Neutral Blue R.
(H. A. Metz & Co., 122 Hudson St., New York.)
5 lbs. Sulphuric Acid.
20 lbs. Glauber's Salt.

Enter at 160° F., bring to a boil and dye at a boiling temperature for one hour.

Neutral Blue R possesses the valuable property of dyeing either in a neutral or an acid bath, and may therefore be used in combination with acid colors for wool dyeing or with the Dianil colors for half wool and cotton. It gives a bright, clear and level shade with good fastness to light, and in light shades is fast to crocking.

Neutral Blue R is also very suitable for silk dyeing.

Recipe No. 72.

Orange on Worsted Yarn.

Chrome Orange on 100 lbs. of worsted yarn. Prepare the dye bath with

3 lbs. Chrome Orange.
(Sykes & Street, 85 Water St., New York.)
3 lbs. Acetic Acid.
1½ lbs. Potassium Bichromate.

The wool is not previously mordanted but entered into the bath directly. It is entered at, or just below the boil, and dyed at the boil for one and one-half hours.

The boiling should be continued for fifteen to twenty minutes after the bath is apparently exhausted.

Chrome Orange produces shades which are very fast to light, washing, acids and strong milling and can be used in combination with alizarine colors.

The dyeing process is simple and with a little practice there will be no difficulty in matching shades.

Recipe No. 73

Scarlet on Worsted Yarn.

Brilliant Scarlet on 100 lbs. of worsted yarn. Prepare the dye bath with

3 lbs. of Brilliant Scarlet.
(Thomas Leyland & Co., 53 India St., Boston.)
10 lbs. of Glauber's Salt.
2 lbs. Sulphuric Acid.

Enter the yarn at 160° F. and dye at boil for one hour.

Brilliant Scarlet produces a bright shade which possesses very good fastness to light and washing.

Recipe No. 74.

Green on Cotton Yarn.

Benzo Green C on 100 lbs. of cotton yarn. Prepare the dye bath with

3 lbs. of Benzo Green C
(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)
10 lbs. of Common Salt.

Enter yarn at 170° F., bring to boil and dye at boil for one hour.

Benzo Green C possesses good fastness to light

for a direct cotton color. It will be found useful in the dyeing of half silk and half wool goods.

Recipe No. 75.

Black on Cotton Yarn.

Ingrain Black 2 B on 100 lbs. of cotton yarn. Prepare the dye bath with

3 lbs. Ingrain Black 2 B.
(Read Holliday & Sons, Ltd., 7 Platt St., New York City.)
10 lbs. Common Salt.
200 gallons of Water.

Enter the yarn below the boil, raise to a boil and dye for one-half to one hour, according to the shade required.

Recipe No. 76.

Black on Worsted Yarn.

Diamond Black P V B on 100 lbs. of worsted yarn. Prepare the dye bath with

8 lbs. Diamond Black P V B.
(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)
3 lbs. Acetic Acid.

Enter at 140° F., bring to a boil and dye at a boiling temperature one-fourth hour. Then add

2½ lbs. Sulphuric Acid,

and boil one-fourth hour longer, and then work one-half hour in the gradually cooling bath. Then add

2½ lbs. of Potassium Dichromate,

and after treat at a boil for three-quarters of an hour.

Diamond Black P V B dyes level and is remarkably fast to light and milling.

Recipe No. 77

Black on Cotton Yarn.

Zambesi Black V on 100 lbs. cotton yarn. Prepare dye bath with

8 lbs. Zambesi Black V.
(Berlin Aniline Works, 213, 215 Water St., New York.)
30 lbs. Common Salt.

Enter at 170° F., bring to a boil and dye at a boil for one hour. Rinse and diazotize in a bath made up with

3 lbs. Nitrite of Soda,
12 lbs. Hydrochloric Acid, 32° Tw.

Work in this bath (cold) for about fifteen minutes, then enter into a cold bath containing

12 oz. Toluylene Diamine Base,
3 lbs. Soda Crystals,

and work in this bath fifteen minutes. Then rinse, soap and dry.

Zambesi Black V is valuable in the dyeing of cotton and silk union goods. The process should be the same as above, except that the temperature must not rise above 180° F.

Recipe No. 78.

Yellow on Cotton Yarn.

Dianol Yellow G on 100 lbs. of cotton yarn. Prepare the dye bath with

1 lb. Dianol Yellow G.
(Thomas Leyland & Co., 53 India St., Boston.)
15 lbs. Common Salt.

Enter the yarn at 180° F., bring to boil and dye at boil one hour.

Dianol Yellow G produces a bright greenish shade of yellow and possesses characteristic properties of the direct cotton colors.

Recipe No. 79.

Brown on Worsted Yarn.

Domingo Alizarine Brown G on 100 lbs. worsted yarn. Prepare the dye bath with

4 lbs. Domingo Alizarine Brown G.
(C. Bischoff & Co., 88 Park Pl., New York.)
15 lbs. Glauber's Salt.
3 to 4 lbs. Sulphuric Acid.

Enter at 140° F., bring to a boil and dye at a boil. When the dye bath is exhausted add

3 lbs. Potassium Bichromate,

and boil one-half hour longer, then wash and dry.

Domingo Alizarine Brown G gives shades which are extremely fast to sunlight, fulling acid, alkalies, and sulphur bleaching. It is a perfect substitute for the alizarines and takes much less time to dye.

Recipe No. 80.

Blue on Worsted Yarn.

Xylene Blue B S on 100 lbs. worsted yarn. Prepare the dye bath with

2 lbs. Xylene Blue B S.
(Sykes & Street, 85 Water St., New York.)
2½ lbs. Sulphuric Acid.
10 lbs Glauber's Salt.

Enter yarn at 170° F., bring to a boil and dye at a boiling temperature for one hour.

Xylene Blue B S gives very brilliant shades of blue, which are quite fast to light and soaping.

Mill News.

COTTON.

New Mills.

*Georgia, Columbus. The new mill for the Muscogee Mfg. Co., to be known as mill No. 4, has been completed. This building is 177 by 105 feet, five stories. The machinery has not been installed, but it is expected same will be ready for operation by midsummer or early in the fall.

Connecticut, East Killingly. The Whitestone Mill, which has been idle for a number of years, has been sold to M. H. Marcus & Bro. of New York, manufacturers of cotton comforters, stair pads, wadding, etc., and will be remodeled and started up at once. They expect to build another mill near the Whitestone in the spring. We understand that this sale was brought about through their reading the article on Mills of Chestnut Hill, which has been appearing in Textile World Record and has aroused much interest in Rhode Island and Connecticut, as many manufacturers, superintendents and overseers are familiar with this district.

Maryland, Baltimore. Contract has been let for the erection of a building, 195 by 80 feet, four stories, for the Wm. J .Hooper Manufacturing Co. Machinery will be installed for making netting and seine twines.

*Massachusetts, Taunton. The Watuppa Mills, reported to erect a new mill at Fall River, will locate here instead. A new building was to have been erected at Fall River, but the company has since secured the Cohannet property and will equip same, for weaving fancy fabrics. This plant will be equipped with 600 looms. Yarns will be purchased. It is hoped to have the mill in operation by fall.

North Carolina, Charlotte. Work has begun on erection of new buildings, 80 by 170 feet and 100 by 50 feet, each two stories, for John B. Ross, replacing the cotton batting plant recently destroyed.

*North Carolina, Greensboro. The White Oak Cotton Mills, which are owned by the Proximity Mfg. Co., and are now under construction, are expected to be ready to start in September. It was planned to start in January, but conditions were such that it was postponed. This mill has 60,000 spindles and 2,000 looms, and will be operated on blue denims.

*North Carolina, Lenoir. Work has been started on the new mill for the Hudson Cotton Mfg. Co., recently incorporated with capital stock of $125,000. J. L. Nelson is president and treasurer of the concern and J. O. White, superintendent. Plant is expected to be ready to start up December 1st, with 5,000 spindles, manufacturing yarns from 20's to 40's. It has not yet been decided whether goods will be sold direct or through commission houses.

*North Carolina, Selma. Work will start about May 1st on the new mill for the Selma Cotton Mill, recently reported incorporated with capital stock of $10,000. They will manufacture hosiery yarns and expect to begin operations about November 1st.

*North Carolina, Shelby. Lowell Machine Shop has prepared plans for the new mill of the Lily Mill & Power Co., of which John F. Schenck of Lawndale, N. C., is president. George E. Ladshaw, Spartansburg, S. C., is the hydraulic engineer.

*South Carolina, Anderson. Work has begun on construction to the new buildings for the Cox Mfg. Co., recently reported to add 12,000 ring spindles to the equipment. The main building will be 325 by 75 feet, two stories, with separate boiler and engine house.

*South Carolina, Central. The Isaqueena Cotton Mills, which are nearing completion, will begin operations about September.

*South Carolina, Honeopath. The Chiquola Mfg. Co. will start work on the erection of their new addition May 1st, and contemplate having same completed in November. They now have an equipment of 15,840 spindles and 400 looms, and when completed they will have a total of 40,320 spindles and 1,000 looms, adding 24,480 ring spindles and 600 looms for manufacturing wide and narrow print cloths.

*South Carolina, Spartanburg. The Beaumont Mfg. Co. will start work about May 15th on erection of new addition to their mill, which they expect to have completed by October 1st. They will instal 6,256 new spindles and 144 looms, giving them a total of 10,144 spindles and 144 looms, making 64/64 and 68/72 4.75 38 and 39 in. 5.15 cloth.

Enlargements and Improvements.

Alabama, Talladega. At the annual meeting of the stockholders of the Chinnabee Cotton Mill it was voted to sell enough stock to add 1,500 spindles to the mill.

Connecticut, Jewett City. The W. A. Slater Mills have adopted the American Moistening Company's system of humidifiers.

Connecticut, Norwich. It is reported that the Falls Company contemplates replacing 12 of its old cards with new ones.

Connecticut, Willimantic. The Windham Mfg. Co. is instaling a number of new mules in the mill.

*Connecticut, Windsor Locks. Contract has been awarded for the erection of new building 166 by 75 feet, 5 stories, for the J. R. Montgomery Co. The old middle building will be razed to allow building at the end to adjoin the present large mill, while the south building will be surrounded by the new one before that is torn down. Work has begun dismantling the middle building, machinery being crowded into other parts of the plant until new one is ready.

Delaware, Wilmington. A new mill, in which nothing but black cloth will be made, is to be built

by Jos. Bancroft & Sons Company. The present mills will then be operated exclusively on white and colored goods.

*Georgia, Canton. An addition of 128 by 54 feet will be built for the Canton Cotton Mills to accommodate the new machinery equipment previously reported to be installed.

Georgia, Cochrane. The present capacity of the Cochrane Mills, 4,636 spindles, is to be doubled.

*Georgia, Hampton. Work is well underway on addition to the Hampton Cotton Mills. The present capacity of the plant will be doubled.

Georgia, Valdosta. The Strickland Cotton Mills have placed an order with the American Moistening Company for the complete equipment of their mill with humidifiers.

Massachusetts, East Webster. The Slater Estate is having plans prepared for an addition to the mills at this place. Capt. Amos Bartlett, agent for the corporation, has the matter in charge. A large modern weave shop, with dye house, bleachery and steam plant, is contemplated. Work will be started some time during the spring or early in the summer.

Massachusetts, Fall River. The Stevens Manufacturing Company have placed a repeat order for humidifiers with the American Moistening Company, Boston, Mass.

*Massachusetts, Fall River. Plans will be completed shortly and figures taken on new addition to be built to the Durfee Mills. A new power house and extension to picker and spinning rooms will be included in addition.

Massachusetts, Fall River. It is rumored that the Arkwright Mill proposes building a new mill this spring for manufacturing finer goods than are now made.

Massachusetts, Lowell. A new building, four stories, will be erected by the Massachusetts Cotton Mills for picking and carding purposes.

*Massachusetts, Great Barrington. The new addition to be built for the Riverdale Mills Co. will be 23 by 54 feet, two stories, and will be used for a storeroom and cloth room as previously reported.

Massachusetts, Hebronville. Ground has been broken for the erection of an addition 40 by 90 feet, two stories, to the Hebronville Mfg. Co.'s cotton mills.

*Massachusetts, Lowell. The new building which the Massachusetts Cotton Mills Co. will erect for a picking and carding mill, will be of brick, four stories, 95 by 136. Building contracts are not yet awarded.

New Hampshire, Hooksett. A large bleachery is being built for the Dundee mills.

New Hampshire, Manchester. The Amoskeag Manufacturing Company have made a very extensive adoption of the American Moistening Company's system of humidification, the system being installed in six of their mills.

New Hampshire, Nashua. The Nashua Cotton Mills are installing four new printing machines in the dye house.

North Carolina, Bessemer City. The capacity of the Whetstone Cotton Mills is reported to be doubled.

North Carolina, Fayetteville. An addition will be built to the Holt-Williamson Mills for the purpose of increasing the capacity.

*North Carolina, Hillsboro. The Eno Cotton Mills advise us that their new building is not yet completed. They will probably start up October 1st with about 350 looms.

North Carolina, Laurinburg. The Dickson Cotton Mills will install 1,920 more spindles in the mill.

North Carolina, Mooresville. The Mooresville Cotton Mills have placed an order for the entire equipment of their mill with humidifiers adopting the American Moistening Company's system.

North Carolina, Norwood. The Norwood Mfg. Co. will erect an addition and install 7,000 spindles.

*North Carolina, Roxboro. Additional buildings will be erected for the Roxboro Cotton Mills, for purpose of adding about 3,000 spindles to the plant.

Pennsylvania, Philadelphia. Contract has been awarded by T. I. Birkin & Co. for the erection of a new building 30 by 40 feet for a bleach house. The most modern improved machinery for bleaching lace curtains will be installed.

Rhode Island, Canonchet. A dye house is to be added to L. E. Edwards' yarn and warp mill.

Rhode Island, Pawtucket. Messrs. J. & P. Coats, Ltd., have placed a repeat order for humidifiers with the American Moistening Company.

Rhode Island Providence. Messrs. B. B. & R. Knight have placed a large repeat order for humidifiers with the American Moistening Company, Boston, Mass.

South Carolina, Anderson. Extensive enlargements are to be made to the plant of the Riverside Mfg. Co.

*South Carolina, Clifton. The Clifton Manufacturing Co. has placed an order for humidifiers with American Moistening Company, the system to cover all departments of their new No. 3 mill.

South Carolina, Fort Mill. An addition 100 by 60 feet, two stories, will be built for the Millfort Mfg. Co. They will install 5,000 additional spindles and 150 gingham looms in same. Work will start at once on construction.

South Carolina, Lancaster. The Lancaster Cotton Mills have let contract for the erection of a new mill office building, 30 by 60 feet. They will also make an addition to the machinery equipment and probably build one or two more warehouses.

South Carolina, Ninety-Six. The Ninety-Six Cotton Mills have placed an order with the American Moistening Company, Boston, Mass., for the complete equipment of humidifiers.

South Carolina, Rock Hill. The Victoria Cotton Mills have discontinued using steam power and now operate the plant with electricity.

*Tennessee, Covington. The Tipton Cotton Mills have increased the capital stock from $75,000 to $100,000. It is thought that improvements will be made to the plant.

Vermont, Springfield. A new addition, 45 by 65 feet, two stories, is proposed by the J. C. Holmes Co. for finishing room.

Mills Starting Up.

*Georgia, Gainesville. The Gainesville Cotton Mill is now in operation. Plant now runs on fine cloths instead of sheetings and as soon as sufficient help can be secured will run to its full capacity.

*North Carolina, Fayetteville. W. L. Holt and associates have purchased the Fayetteville Cotton Mills, which have been idle for the past two years, and will start same in operation at once. The mill will be enlarged and new machinery installed for manufacturing high grade yarns.

*Georgia, LaFayette. Partial operations have begun in the new plant of the LaFayette Cotton Mills. It is expected that the plant will be in full operation early this month.

Mills Shutting Down.

New York, Stuyvesant. The Van Alen Cotton Mills have been shut down on account of their dam being washed away by high water. It will probably be some time before operations will be resumed.

Rhode Island, Lonsdale. All of the Lonsdale Company's mills have been shut down for an indefinite time owing to the high price of cotton and condition of the cotton goods market.

WOOLEN.

New Mills.

Pennsylvania, Philadelphia. David Greer Orme has just started in the manufacture of cotton and worsted dress goods on 30 looms in the basement of Pfingst's Mill, Kensington Ave. and Ontario St. The goods are sold direct and through commission houses.

Pennsylvania, Philadelphia. The Philadelphia Art Square Mfg. Co., a recently formed company operating at Wayne and Bristol streets, Nicetown, reports having had a very prosperous season since starting. The members of the firm are H. S. Stansfield and Frank C. Heath, both at one time employed by the Crompton & Knowles Loom Works (Phila. Branch). They are now running three looms but expect within a very short period to increase the number to ten.

Pennsylvania, Philadelphia. S. A. Feather, a former director and superintendent of the Winola Worsted Yarn Co., Tunkhannock, Pa., has within the past two or three weeks started up a spinning plant for the purpose of manufacturing fine worsted knitting yarns under the name of S. Feather & Company at the corner of Franklin and Girard Avenue. Mr. Feather's two sons, W. H. and F. S. Feather, both expert worsted yarn spinners, are also located here with their father. The yarn is sold direct and many orders are already being received by them.

*Rhode Island, Greystone. Work on the new factory for Joseph Benn & Sons, 683 Broadway, New York, will soon be started. Plans are now being figured. F. P. Sheldon is the mill engineer in charge. Harrison Benn will be the manager. The mill will make linings of silk, alpaca and mohair.

*Tennessee, Athens. J. D. Williams is president of the Chilhowee Woolen Mills, incorporated recently with capital stock of $50,000; F. L. Blizzard, secretary of the Athens Woolen Mill, is manager. The mill will be equipped with 3 sets cards and 100 looms for manufacturing jeans. It is expected that the plant will be ready for operations September 1st.

Enlargements and Improvements.

*Connecticut, Hanover. The Airlie Mills have recently completed the erection of a new picker house, 75 by 50 feet, and installation of a new picker.

Connecticut, Meriden. The Meriden Woolen Mills are installing two sets of cards.

Connecticut, Norwich. The Clinton Mills have installed four new looms in the plant.

Connecticut, Rockville. The Rock Mfg. Co. contemplates building an addition, one story, 30 by 30 feet, for a dye house.

Connecticut, Rockville. Contract has been let by the Rock Mfg. Co. for a brick addition to the old Leeds Mill.

Connecticut, Stafford Springs. A new 200 h. p. boiler is being set up in the Fabyan Woolen Company's plant.

Connecticut, Thompsonville. Ground has been broken for the erection of a new dye house for the Hartford Carpet Co. The building will be 100 by 60 feet, two stories.

Maine, Dexter. Work has started on erection of a large addition to the Morrison Woolen Co's lower mill. The building, which will be 36 by 40 feet, will be used as a finishing department.

Massachusetts, Barre. A new 250 h. p. boiler has been installed in the woolen mill at this place.

Massachusetts, East Dedham. The Cochrane Mfg. Co. has installed some new Axminster looms for purpose of experimenting. They are also building an addition 70 by 80, two stories, for the new machinery equipment and also to obtain more space for their printed velvet carpet plant.

Massachusetts, Fitchburg. American Woolen Company has plans under consideration for an addition to the finishing room of the Beoli Mill, which will be built 75 by 35, one story high. W. L. Whitney, the mechanical superintendent at the Washington Mills, Lawrence, has the matter in charge.

Massachusetts, Graniteville. A new one-story boiler house is under construction for the Abbott Worsted Co. Two new boilers, with capacity of 200 H. P. each, which can be increased to 500 H. P. will be installed.

*Massachusetts, Lawrence. Walworth Bros. expect to have their new mill completed about July or August, and when completed will remove from the building which they now rent to the new one. From 50 to 60 looms will be installed.

Massachusetts, Pittsfield. A new spinning machine is being installed in the Pontoosuc Mill.

Massachusetts, Pittsfield. The Pontoosuc Woolen Manufacturing Company have placed a repeat order with the American Moistening Company, Boston, Mass., for completely equipping their mills with humidifiers.

Massachusetts, Webster. An addition, 132 by 88 feet, three stories, is under construction for the Chase Mill. New carding, spinning and finishing machinery will be installed in same, also the burling and mending departments. During the summer a new engine and three water wheels will be put in.

Massachusetts, Westford. Work will soon start on another addition to George C. Moore's wool scouring plant.

Massachusetts, Worcester. M. J. Whittal will install new German rug looms in his plant.

*Michigan, Sault Ste Marie. The Soo Woolen Mills will start work early in April on an addition to their plant for purpose of increasing the capacity. They expect to have same completed by June 15th, operating 2 sets cards and 7 looms.

New Hampshire, East Rochester. The Cocheco Woolen Manufacturing Co. is to install a new boiler in the plant.

New Hampshire, Franklin Falls. Extensive improvements are being made to the M. T. Stevens & Sons' woolen mills. An additional story is being added, giving more floor space. New engine is being installed and 16 new looms.

Maine, Houlton. The Houlton Woolen Mill Co. has been incorporated with capital stock of $35,000 to operate the Houlton Woolen Mills, now at this place. J. W. Maxwell is president of the company, J. C. Dill, treasurer, and Charles A. Bagnall, secretary.

Ohio, Hamilton. An additional set of cards and new spinning machinery has recently been installed in the Miami Woolen Mills.

Pennsylvania, Chambersburg. The Chambersburg Woolen Co. is contemplating an enlargement of its plant and installation of new machinery in the weaving and finishing departments. D. K. Appenzellar is the buyer.

Pennsylvania, Emlenton. L. W. Huyck has purchased an interest in the Appollo Mills which contemplate adding another set of cards.

Pennsylvania, Milltown. A new woolen mill, 125 by 65 feet, three stories, stone, is to be erected for the Christian Dutt Estate, now operating a woolen mill here.

Pennsylvania, Philadelphia. Alexander Erskine, manufacturer of shawls, blankets, etc., on 20 looms at 4th and Somerset Streets, reports that he is about to add 10 more Crompton and Knowles looms, making his equipment 30 in all.

Pennsylvania, Philadelphia. A new boiler house is to be erected for Thos. Wolstenholme Sons & Co. and alterations and additions made to the power plant.

*Pennsylvania, Philadelphia. J. S. Cornell & Son have secured contract for erection of the new addition for the J. S. Dunlap Carpet Co., 56th St. and Lancaster Ave.

Pennsylvania, Philadelphia. Estimates are being made by William Steele & Sons and Stacy Reeves & Sons on plans for a boiler and engine house for the Fern Rock Woolen Mills. Bids are to be closed April 4th.

Pennsylvania, Philadelphia. F. W. Walter & Co.'s Nicetown Mills, Germantown Avenue, above Broad Street, is very busy. They manufacture wool shoddies and garnetted worsted waste on 8 cards, 1 garnett and 5 pickers. This concern is about to put in two more garnetting machines which will enable them to keep up with the orders on hand.

Pennsylvania, Philadelphia. Daniel Scott, manufacturer of wool stock, cotton and woolen waste, etc., formerly located at 109 Jefferson Street, Germantown, has removed to the building at one time occupied by the Insinger Mfg. Co. on Stenton Avenue above Wayne Junction. He reports business good.

*Rhode Island, Providence. Bids will soon be asked for the new building which the Centredale Woolen Company propose to erect on the site recently occupied by the Blanding Company.

Virginia, Fredericksburg. An enlargement is being made to the Mellville Woolen Co.'s plant. A large addition is under construction for a stock house and the main building raised another story. Two large water wheels and additional machinery will also be installed.

Tennessee, Athens. The Springfield Woolen Mills, which have recently begun operations, contemplate doubling the present capacity of the plant.

Mills Starting Up.

*Massachusetts, Huntington. Operations have been resumed in the Massasoit Mills. Kersey and melton suitings are made.

*Massachusetts, Uxbridge. A number of looms have been started up by the Vim Woolen Co. and it is expected that within a short time the entire plant will be in operation.

Rhode Island, Allentown. The Bellville Mill has been closed on account of the unfavorable condition of trade. It is thought that operations will be resumed in about two weeks.

Mills Shutting Down.

Delaware, Newcastle. The Fort Casimir Woolen Mills have been shut down.

Massachusetts, Athol. The Eagleville Woolen Mills, E. S. Handy, proprietor, have been shut down. This plant is operated on shoddy.

KNIT.

For Knitting Mill News, see Knitting Department.

SILK.

New Mills.

*Connecticut, So. Norwalk. Boese, Peppand & Co., of New York is the new concern which will locate its mill here for manufacturing Swiss embroideries, applique trimmings, etc. Plans and

specifications for the plant are being prepared and will be ready in about two weeks.

New Jersey, Paterson. The Aetna Silk Company has been incorporated with capital stock of $100,000, for manufacturing silks. Plant will be located at 39 Lakeview Ave.

*New York, Andover. The Rochambeau Silk Company's plant is now in full working order.

*New York, Binghamton. The machinery of the Chenango Valley Silk Mill, which has been delayed, is being installed in the mill and it is thought that operations will be started early this month. Mr. Ruegg is general manager of the mill.

*New York, Cortland. The Cortland Silk Mfg. Co. has been incorporated with capital stock of $50,000 to operate a plant for manufacturing broad silks. M. P. Tague (Scranton, Pa.), C. P. Walrad, Robert Bushy and Martin Casey are interested in the company. A building 120 by 43 feet, one story, to accommodate about fifty looms, will be erected.

*New York, Hamilton. Contract has been let by the Gloversville Textile Co. for the erection of the new building. Work will start as soon as possible.

New York, New York. The new mill of Woodhouse, Bopp & Co., at West Pittsburgh, Pa., is now in full operation. In this mill the company has installed 200 looms, which they are running on broad silks of all kinds. Mr. G. H. Uhlig, Jr., formerly superintendent of the main mill at 251-59 W. 67th St., has charge of the new plant, and T. H. Bopp is the superintendent and buyer for the New York establishment. The company is also moving the office in New York to Grand and Wooster Sts. S. Peierls & Co. sell the goods.

New York, New York. Wells Bros. & Straus are running 30 looms on silk ribbons at 403-5 E. 91st St., and report business as very good. Mr. Emil Mutzberg has charge of the mill. The goods are sold through Schaeffer, Schramm & Vogle, New York.

*Pennsylvania, Chambersburg. E. B. Baker, Scranton, Mr. McNulty, G. H. Stewart, I. M. Nelson and Joseph Sierer are interested in the new silk mill to be established at this place.

*Pennsylvania, Nanticoke. Operations have been started in A. L. Storms & Co's new mill. When in full operation, about 150 people will be employed.

Pennsylvania, Philadelphia. G. Josephs has recently started a business for the winding of silk on commission at 526 Jefferson Street. He is very busy running 8 winders, which will be increased to 12, two machines having already been ordered. Mr. Josephs was formerly a member of the firm of Josephs & Herbst, manufacturers of upholstery goods in the Ontario Mills.

Enlargements and Improvements.

Connecticut, New London. Work has been started on the erection of an addition 160 feet long, four stories high, for the Brainerd & Armstrong Co. They will also build a four-story building 75 feet long.

Illinois, Chicago. The Wilson Braiding and Embroidering Co. has leased the fifth floor of the building 185-187 Wabash Ave.

Massachusetts, Newton Upper Falls. The Newton Mills have increased their system of humidifiers installed by the American Moistening Company.

*New York, Lyons. The Gloversville Silk Mills contemplate materially enlarging the mill here.

*New York, Lyons. Six new machines have recently been installed in the branch mill of the Gloversville Silk Mills.

New York, New York. The Star Ribbon Mfg. Co., 224 Centre St., report being very busy and to facilitate matters they are seeking another location within a radius of a few miles of New York City which will permit them to materially enlarge their plant. They operate 60 looms on ribbons, hat bands, corset and underwear trimming, selling the goods direct.

New York, New York. Thomas Ineson, manufacturer of satins, satin and Picot ribbons, cords, tassels, with factories in Paterson, N. J., and Providence, R. I., is removing his New York office and finishing department from 310 Broadway to 70 Greene St. The establishment is operated by electricity.

Pennsylvania, Alburtis. Two new ribbon looms are being installed in the Alburtis Ribbon Mills.

Pennsylvania, Bethlehem. An additional story, making the fourth, is being added to Fichter & Martin's mill.

Pennsylvania, Scranton. It is reported that the Sauquoit Silk Company contemplates building a large silk weaving mill in West Scranton, to furnish employment for about 400 people.

*Pennsylvania, East Mauch Chunk. We have been advised by D. G. Dery that there will be no change in the mill there. The spinning and weaving machinery are in full operation.

Pennsylvania, Emaus. Additional machinery is being installed in the Paul Gumbinner Co.'s silk mill.

Pennsylvania, Harrisburg. The Harrisburg Silk Mill is to manufacture fancy silks. Hitherto the plant has been operated on plain goods. Ten new looms have been installed for the purpose and ten others will soon be started up. Sixty of the plain looms are being changed over for fancy goods also.

Pennsylvania, Lancaster. Messrs. Stehli & Co. have placed their order for humidifiers with the American Moistening Company, Boston, Mass.

Pennsylvania, York. The Monarch Silk Mill has removed the warping department from the second to the third floor of the mill. This will allow more space for erection of their new warping mills.

MISCELLANEOUS.

New Mills.

Massachusetts, Hyde Park. The Fairmount Wool Scouring Co. is installing a washer in the mill and will also add another carbonizer. A dryer has recently been added.

Personals.

PERSONALS.

Cotton.

Guy G. Paris, formerly secondhand of carding in the Massachusetts Mills, Lowell, Mass., is secondhand of carding and combing in Dana Warp Mills, Westbrook, Me.

J. D. Karnitshka, of Adams, Mass., has gone to Housatonic, Mass., where he has accepted the position of secondhand carder.

James C. Grant, who severed his connection at the Warren Cotton Mills, W. Warren, Mass., last August, has accepted a position as overseer of the weaving department in the No. 2 mill of the Great Falls Mfg. Co. at Somersworth, N, H., succeeding another Mr. Grant, who has gone to New Bedford.

Charles F. Howe, who has been employed as overseer of the cloth room of the Chicopee Mfg. Co., Chicopee, Mass., for the past 16 years, has resigned.

J. B. Livsey, overseer of carding at Georgiaville, R. I., has resigned and accepted a position as overseer of carding at Readville Cotton Mills, Readville, Mass. He is succeeded by I. W. Curtis, formerly carder at Windham Mfg. Co., Willimantic, Conn.

Thomas Speakman, superintendent of the Uncasville Mfg. Co., Versailles, Conn., has resigned. R. G. McMeehan, of Uncasville, has taken charge in connection with his duties at the Uncasville Mill.

William K. Sawyer, late of Holyoke, Mass., has accepted the position of designer at the Bristol Mfg. Co., New Bedford, Mass.

George Porter, overseer of mule spinning at Mill No. 4 of the Thorndike Co., West Warren, Mass., has resigned.

Fred McDevitt, formerly of the Beaver Mill, North Adams, Mass., has become overseer of mule and frame spinning, spooling warping, slashing, drawing in and twisting for the West Boylston Mfg. Co., East Hampton, Mass.

T. H. and J. S. Fairchild, who have been in charge of the mills at Opelika, Ala., as superintendents for some years, have severed their connection, and Frank G. Bell, assumes charge.

Emil Kipper, treasurer of the Renfrew Manufacturing Company, Adams, Mass., has resigned his office and disposed of his interest in the concern.

V. D. Molloy, former secretary and treasurer of the Columbus (Miss.), Hosiery Co., will manage the new Southern Cotton Down Company, recently organized, whose plant will be at Columbus.

A. S. Covel, treasurer of the Tremont & Suffolk Mills, has been elected treasurer of the Boott Cotton Mills, Lowell, Mass.

Oliver D. Drew, until recently superintendent of the B. B. & R. Knight Co.'s cotton mill in Woonsocket, R. I., has been appointed superintendent of the Dwight Manufacturing Company's mill in Chicopee. Alderman Frank L. Simpson of Chicopee, who has been superintendent in the mill for eight years, resigned about a month ago.

D. J. Carey is the new dyer at the Boston Manufacturing Company, Waltham, Mass. He was formerly dyer at W. C. Plunkett & Sons, Adams, Mass.

D. R. Harriman is the very efficient superintendent of the Olympia Cotton Mills of Columbia, S. C. which position he has filled since February last, during which time, for the first time since the mill has been built, all of the 100,320 spindles in this mill have been running, and under his management the production has also been increased 20 per cent.

Horace P. Carter succeeds Robert Morang as agent of the Edwards Manufacturing Co., Augusta, Me. Mr. Carter has had positions in the Canadian Colored Cotton Co., Milltown, N. B., and also in the South. The new superintendent at this mill is A. F. Pratt, formerly of the Bates Mill, Lewiston, Me.

Woolen.

John Bond, overseer of finishing at the Plainfield Woolen Co., Moosup, Conn., has resigned.

James Robinson is now overseer of spinning at the Hudson Blanket Co., Hudson, Mass.

G. F. Courtney, who for a number of years has been overseer of the carding department at the Lawrence, Webster & Co. Mill, Malone, N. Y., has resigned and J. J. Driscoll of Franklin Falls, N. H., has been engaged to take his place.

J. Irons, boss carder, has resigned from the Tarkiln Yarn Co., and has gone to Pascoag, R. I.

David Webster, late at the Laurel Hill Mill, is now boss carder at the mill of Mower Bros., Tarkiln, R. I.

H. R. Cushing has succeeded J. Horan as superintendent at the Saxtons River Woolen Mill, Saxtons River, Vt. He was formerly of the Columbia Worsted Co., Wallingford, Pa.

William Simonds, recently boss finisher in the Golden Rod Woolen Mills, Wales, Mass., is now with the Thayer Woolen Mills, Ashuelot, N. H.

William Hill has resigned as overseer of finishing at the Holden & Fuller Mill, Palmer, Mass.

F. H. F\ Ballou is the new superintendent at the Murdock Mills, New Boston, Conn., succeeding John West.

James A. Taylor, late of Gloucester City, N. J., has taken full charge of finishing for Alfred Dolge Mfg. Co., Alhambra, California.

Peter Hommelshein, formerly at the Hanover (Ill.) Woolen Mfg. Co., is now superintendent at the Topeka Woolen Mills, Oakland, Kans.

David Sheriffs has resigned as superintendent of the Scotia Mills, Woonsocket, R. I., and been succeeded by Fred Dawson, formerly designer.

Frank Clarke, boss weaver with the Maryland Woolen Mills, Baltimore, Md., for 10 months, has

recently accepted a position as boss weaver with Wood & Co., Philadelphia, Pa.

William Higginson, overseer of weaving at the Hargraves Mill, North Shapleigh, Me., has resigned.

J. A. Barron, who has been in poor health for some time, has been succeeded by J. W. Wright of Buena Vista, Va., as superintendent of the Neponset Woolen Mills, Canton Junction, Mass.

John S. Butterworth, who has been engaged as superintendent and designer with the Portland Woolen Mills, Portland, Ore., for the past year, has recently resigned and returned to Pennsylvania.

A. Jewell, North Shapleigh, Me., has accepted the superintendency of the Meriden Woolen Mill, Rawitser & Brother, Meriden, Conn.

Joseph Wood has resigned as overseer of dyeing at the woolen mill of Helliwell & Co., Pittsfield, Mass.

Walter S. Hobbs of Uxbridge, Mass., has accepted the position of designer with the Somerset Mfg. Co., Raritan, N. J.

John Loomis, for twenty years overseer of spinning at the Massasoit Woolen Mills, Huntington, Mass., has resigned. He is now in a similar position with the Springfield (Mass.), Knitting Co.

O. M. Pritchard has accepted the position of overseer of weaving for the Racine (Wis.) Woolen Mills.

John Horan has been engaged as superintendent by the Hanover Woolen Mfg. Co., Hanover, Ill.

Frank C. Wilson, for the past three years boss finisher and dyer for the Reynoldsville (Pa.) Woolen Company, resigned his position April 1st.

William Clogher is the new superintendent at the St. Mary's Woolen Mfg. Co., St. Mary's, O.

D. F. Welch, dyer at the Squam Lake Woolen Mill, Ashland, N. H., has resigned.

Joseph Sykes has resigned his position as superintendent of the Ounegan Mill, Old Town, Me. O. F. Ireland of Boston has been engaged to fill the position.

William O. Devoll has resigned as president of the New Bedford Textile School at New Bedford, Mass. William E. Hatch has been elected to succeed him.

Sydney W. Coolidge has been elected treasurer of the Lowell Bleachery, Lowell, Mass. He was formerly treasurer of the Stark Cotton Mills of Manchester, N. H., and later of the Fore River Ship & Engine Co.

Charles F. Kuett, a well known silk manufacturer, has been appointed superintendent of the newly organized Upland Silk Company, Paterson, N. J., which recently acquired the ribbon plant formerly owned by the Coronet Silk Company and operated in the Hamil Mill.

George Chatterley has been appointed special examiner of textile machinery by the Board of Appraisers to fill the place of W. W. Castle at the Boston Customhouse. Mr. Chatterley has a wide knowledge of textile machinery. He is an Englishman by birth, and was connected for a number of years with Howard & Bullough Works. He was with their American agency for a number of years, and was afterwards about eight years travelling representative for Mr. Evan A. Leigh, and thus is widely acquainted with American manufacturers. About two years ago he bought a ranch in California, and has been living there until appointed to this position, which he has accepted and entered upon his duties. Mr. Chatterley is a man of stirling qualities, and thorough familiarity with the special machinery which he has to examine.

W. R. Gillespie has accepted the position of manager of the Cooper Mercerizing Co., Coventry, R. I.

Albert E. Dean has been appointed assistant instructor in dobby and box work at the Bradford-Durfee Textile School, Fall River, Mass.

H. F. Schaefer is the new boss finisher at the Matteawan Mfg. Co., Matteawan, N. Y. He was formerly of the Dundee Woolen Co., Passaic, N. J.

Franklin S. Jerome succeeds J. Hunt Smith as secretary and treasurer of the United States Finishing Co., New York.

Charles Baral is the new boss weaver at the Benj. Lucas Co.'s mill, Poquetanuck, Conn.

George Race, for seven years superintendent for Wm. Wood & Sons, Philadelphia, has engaged as superintendent with E. T. Steel & Co., Bristol, Pa.

Jacob Ackerman is the new overseer of dyeing at the Appleton Woolen Mills, Reedsburg, Wis.

Mr. Senior of Auburn, N. Y., has engaged with the Mohawk Valley Woolen Co., Frankfort, N. Y., as superintendent of bed blanket department.

James W. Williams, overseer of carding at the Jefferson Mfg. Co., Jefferson, Mass., has resigned to accept a similar position with the Hudson River Woolen Mills, Newburgh, N. Y.

Sumner A. Leach has succeeded James Morrow as carder at the Brigham Mills, Danielson, Conn.

T. Webster is the new carder and spinner at the United States Bunting Co., Lowell, Mass.

Thomas Walsh is the new cloth inspector at the French River Textile Co., Mechanicsville, Conn.

John R. MacGregor has succeeded Harry Gill as boss dyer at the F. S. Mackenzie Mill, Bridgewater, Vt.

Lewis Wagner has succeeded Fred Mantz as overseer of dressing at the Somerville Woolen Mills, Somerville, N, J.

J. J. Fearon is the new overseer of carding at the Meriden Woolen Co., Meriden, Conn.

William Henderson, Watervliet, N. Y., woolen carder, now is with Robert Bleakie, in the Webster Woolen Co., Sabattus, Me.

Fred J. Toof, night superintendent of the Atlantic Mills, Olneyville, R. I., is now overseer of the cloth room, succeeding Albert Taylor.

Miscellaneous.

Managing Director C. P. Brooks severed his connection with the New Bedford Textile School on March 31st, and will in future devote his entire

attention to the textile department of the International Correspondence Schools of Scranton, Pa. The work of this department will still continue to be conducted from New Bedford. He is succeeded in the management of the New Bedford Textile School by Mr. H. W. Nichols, who for several years has been one of the assistants in the correspondence school. Mr. Nichols' title will be that of Superintendent.

Ervin Dryer has resigned his position in connection with the Westinghouse Electric & Manufacturing Co., and has accepted an appointment with the Allis-Chalmers Co. Mr. Dryer's connection with the Westinghouse Co. extended over a period of 16 years. He is one of the most competent salesmen in the electrical and mechanical field, and his wide acquaintance throughout the western part of the United States will be of great service to the Allis-Chalmers Co. in the extensive new developments which they have undertaken. Mr. Dryer has already entered upon his new duties with the Allis-Chalmers Co., and his headquarters will be at their offices in the New York Life Building, Chicago. He will give his attention to their engine work as well as to the sale of Bullock electrical apparatus, which the Allis-Chalmers Co. now control through their acquisition of the Bullock Electrical Manufacturing Co., of Cincinnati.

Deaths.

Edward Thorp, proprietor of the Enterprise Worsted Company, Millville, Pa., died on the 9th of April. He was about 67 years old and born in Yorkshire, England. The business will continue under the management of Harry Thorp.

James L. Teller, for 34 years prominently identified with the Fishkill Landing Machine Co., Fishkill-on-the-Hudson, N. Y., as secretary and treasurer, died at his home in Newburgh. About a week before his death Mr. Teller suffered from a stroke of paralysis from which he was unable to recover. He was 66 years of age and leaves a widow and two daughters. During the many years Mr. Teller was connected with the Fishkill Landing Machine Co. he became widely known among manufacturers and was universally esteemed for his many sterling qualities. His death will be deeply felt by all who have been brought in business or social contact with him.

The Hon. Titus Sheard of Little Falls, N. Y., died suddenly of heart disease at his home on April 13th. Mr. Sheard was one of the best known manufacturers in the country. He was born in Batley, England, in 1841, coming to this country in 1856, landing with hardly a dollar in his pocket. He secured employment in the woolen mills at Little Falls, and gradually worked his way up. He commenced the manufacture of shoddy in Little Falls, and a few years later purchased an interest in a knitting mill at Oriskany, which was burned down. After that he was for some years in the clothing business, and then started a small woolen yarn mill, which proved very successful. In 1872 he embarked in knit goods manufacturing, and from that time on the Titus Sheard Company grew until it became one of the largest in the state. Mr. Sheard was prominent in politics, always being a strong republican and protectionist. He served several terms in the State Assembly and also in the Senate.

Charles W. Darling, a retired Manhattan business man, aged 72 years, died at Long Island, April 25. He was formerly a member of the firm of Belding Bros., silk manufacturers.

C. H. Klemer, senior member of the firm of Klemer & Sons, owners of the Faribault Woolen Mills, Faribault, Minn., died April 2d, at the age of sixty years.

Clark H. Sampson, president of the Corticelli Silk Company, St. Louis, Mo., died March 30th. Mr. Sampson was born in Hatfield, Mass., in 1850. Shortly after he left school he accepted a position as traveling salesman for an Eastern silk manufacturing concern, later becoming secretary of the corporation. He went West in 1879, locating at St. Louis, where he founded the Corticelli Silk Company. Since he first embarked in business in this town, twenty-five years ago, Mr. Sampson has been one of the most prominent figures in the city's commercial and social life. He was also prominent in politics. Besides his interest in the Corticelli Silk Company, he was a director in the Nonotuck Silk Company and was interested in other concerns in St. Louis and elsewhere. The death of Mr. Sampson, though a great shock to a host of friends and acquaintances, was not entirely unexpected, as for some months past he had not been in the best of health. He leaves a wife and four daughters.

George Hamilton Wiley, a retired cotton manufacturer of Brooklyn, N. Y., died recently. The deceased was born in East Douglas, Mass. He was manager of the Utica Steam Cotton Mills, Utica, N. Y., and later became vice president of the company, which office he held till he retired about 10 years ago.

F. X. Burton, president of the Riverside Cotton Mills, Danville, Va., died recently. He was born near Yanceyville, Chaswell County, N. C., August 1, 1848. In 1882, in conjunction with the late C. G. Holland, he built the Morotock Cotton Mills and operated them until 1891, when they were consolidated with the Riverdale Cotton Mills, Mr. Burton being the largest stockholder and subsequently president of the company. He leaves a widow.

Richard Jones died at the home of his daughter in Alderbrook, near West Eaton, N. Y. Mr. Jones was nearly all his life a manufacturer, and for more than 25 years was connected with the West Eaton Woolen Mill, the firm name being Lewis, Thomas & Jones. Later he was connected with the Cambria Woolen Company up to the time of his death.

Isaac T. Farwell, a retired silk manufacturer, died April 2d, aged 71 years. Mr. Farwell was a native of Mansfield, but had spent much of his life in Newton, Mass., where he was a silk manufacturer. He retired from business a few years ago.

Franklin A. Wilson, treasurer of the Lambeth Rope Company, New Bedford, Mass., died recently after an illness of a few weeks. Mr. Wilson was about 30 years old, and since the reorganization of this company had filled the position of treasurer and manager, and was well known throughout the textile trade through his travels in behalf of the company's interests.

New Publications.

Manufacture of Lake Pigments from Artificial Colors; by Francis H. Jennison, F. I. C., F. C. S., D. Van Nostrand Company, New York City. Price $3.00.

This work is written for the manufacturers of pigments of artificial colors. Not many years ago, before the development of artificial deystuffs, pigments were made from such dyestuffs as cochineal, logwood, fustic, etc. Many of these old products are still in limited use, but most of the pigments manufactured at present are made from the artificial dyes. The author of this work treats the subject in a thoroughly scientific manner. The subjects of the chapters following the introduction are: The Groups of the Artificial Coloring Matters; The Nature and Manipulation of Artificial Colors; Lake-Forming Bodies' Basic Colors; Lake Bases; The Principles of Lake Formation; Red Lakes; Orange, Yellow, Green, Blue, Violet, and Black Lakes; The Production of Insoluble Azo Colors in the Form of Pigments; The General Properties of Lakes Produced from Artificial Colors; Washing, Filtering, and Finishing; Matching and Testing Lake Pigments.

This work is in English, but its merit is shown by the fact that it has been translated into German, although Germany leads all other countries in the manufacture of artificial dyes.

Principles of Wool Combing; Howard Priestman; The Macmillan Co., New York City. Price, $1.50.

The appearance of this book is timely as there is pressing need for a handbook on worsted yarn manufacture. The author has confined himself to wool combing and the preparatory processes. The book is freely illustrated with diagrams and views of the latest types of machines. Following is an abstract of the table of contents: Wool; washing; water; carding; preparing; intermediate processes; combing; Lister comb; Holden comb; Noble comb; finishing; tops and top testing.

Bulletin of the National Association of Wool Manufacturers, Boston, Mass.

The March issue of this bulletin is made up as follows: Addresses by Chas. H. Harding and John Bruce McPherson before the National Wool Growers' Association; proceedings of the thirty-ninth annual meeting of the National Association of Wool Manufacturers; annual report of the secretary; obituary notices; editorial and industrial miscellany; imports and exports of wool and woolens; report of the Boston wool market.

Spinning of Cotton, Flax, Hemp and Jute (Filature Mecanique du Coton, du Lin, du Chanvre et du Jute); J. Lebegue & Co., Paris, France.

This is one of a series of industrial monographs issued under the auspices of the Belgian government. The first part of the work gives statistical information regarding cotton manufacturing establishments and their employees, the latter being classified according to the method of payment for their labor. Then follow chapters describing the various machines used, the methods of reeling and packing cotton, etc. Parts 2, 3 and 4 treat of the linen, hemp and jute industries respectively. Each part contains a list of Belgian manufacturers in that line. The text is in French.

Comparative Tables of Cotton Quotations; by Otto Driesen; Julius Booch, Werdau, Germany. Price, $1.00.

The adoption of the decimal system for cotton quotations on the Liverpool Cotton Exchange, has made it necessary for cotton dealers and manufacturers on the continent to revise their tables of equivalents to correspond with the decimal division of English money. This has led to the publication of the book above named. The first table gives the equivalents of pence per English pound in pfennige per Continental pound, at different rates of exchange, the English values being stated for each 1/100th of a penny. Then follow tables as follows: 2. Equivalents of hundredths of a cent (American) per lb. in pfennige per Cont. pound; 3. Equivalents of pence per lb. in pfennige per Cont. pound; 4. Pence per lb. in francs and marks per 50 kilograms; 5. Pence per lb. in heller per Cont. pound; 6. Spinners' equivalents; 7. Comparative yarn tables; 8. Descriptive table of grades of cotton; 9. Crop reports; 10. Weights and measures. The text of the book is German.

The Calculation of Woven Fabrics (Die Calculation de Webwaren); J. Schams, Director of the Royal School in Muenchberg; J. Riedel, Muenchberg, Germany. Price 75 cents.

This is a handbook for schools and self-instruction. The first chapters are devoted to the analysis of fabrics. Directions are given for determining the face and back, set, take-up, loom width, reed, weight, quantity of material required for a given quantity of goods, and cost of fabrics. A serious omission is the absence of any reference to the method of determining the size of the yarn in a sample. This is by no means the only deficiency in this work, which falls far short of the expectations raised by the title. French and German technical literature in general enjoys a deservedly high reputation, but that part of it devoted to textile calculations, although voluminous, is exceedingly poor in quality. This inferiority is due to the confusion of weights and measures in Continental Europe. The talent, energy and ingenuity of German and French textile calculators are taxed to find a way, no matter how devious, out of the tangle of incommensurable basic standards in which they are involved. Under such conditions a simple and direct system of textile arithmetic is impossible. This explains the deficiencies of Continental books on this subject. The work under review, the latest to be published, is much poorer than usual, owing to the many subjects omitted, rather than to the manner of treating those that do receive consideration.

Aniline Black and Its Use in Dyeing and Printing (Anilinschwarz und seine Anwendung in Farberei und Zeugdruck): E. Noelting and A. Lehne; Julius Springer, Berlin, Germany. Price, $2.50.

During recent years there has been a marked tendency toward specializing in books on the textile industry. While there is something to be said for and against this practice, the present treatise on the

dyeing of aniline black goes far to prove the wisdom of the method. Following is an abstract of the table of contents: Constitution of aniline black; its use in printing; aniline black on wool and silk; its use in dyeing; testing of accessory materials; testing aniline black colors; recipes with printed and dyed samples.

Weaving Woolen and Cotton Goods (Tessuti di Lana e di Cotone); by O. Giudici; Ulrico Hoepli, Milan, Italy. Price $4.00.

Within the last ten years there has been a rapid development of the textile industry in Italy due to causes which have already been explained in our columns. It is therefore to be expected that a manual of weaving, such as the present elaborate work, should be published in Italian for the benefit of the manufacturers of that country.

The first part is devoted to the characteristics of the different textile fibres. This is followed by an explanation of the various systems of yarn numbering, the English system taking the leading place as it is the standard for the Italian cotton industry. A number of comparative yarn tables are given to aid in converting the English into the metric standards. The English worsted system of numbering yarn occupies a leading place, and a chapter is devoted to the numbering of woolen and worsted yarn. Another chapter treats of textile calculations, of which it gives the more important. This is followed by a very clear and useful explanation of fabric analysis.

The remaining and by far the greater portion of the work contains a treatise on weave construction and is profusely illustrated with colored plates. The work is a credit to both author and publisher, and in many respects might well serve as a model for English writers.

Business Literature.

Catalogue No. 115; B. F. Sturtevant Co., Boston, Mass.

A condensed catalogue containing an illustrated description and price list of the different types of forges, blowers, exhausters, fans, motors, etc., built by this well known company.

Sederholm Boiler; Allis-Chalmers Co., Chicago, Ill.

This is an interesting pamphlet describing the Sederholm boiler and containing much information regarding the requirements of a good boiler. It contains calculations on furnaces, grate area, heating surface, sooting devices, circulation, priming, water and steam space, scale, cleaning, safety, etc.

Dust Collecting; The Hartford Blower Co., Hartford, Conn.

A descriptive catalogue of the various devices manufactured by the Hartford Blower Co. for collecting and disposing of dust.

Buffalo Blower; Buffalo Forge Company, Buffalo, N. Y.

An illustrated booklet describing the different types of geared hand blowers manufactured by the Buffalo Forge Company.

Jeffrey Machinery, Circular No. 23; Jeffrey Mfg. Co, Columbus, Ohio.

This circular contains a summary of the various machines manufactured by the Jeffrey Mfg. Co., a more detailed description of which will be found in their special catalogue.

Care of Driving Chains; Joseph Dixon Crucible Co., Jersey City, N. J.

A circular giving directions for the proper care of driving chains which necessitates the use of the Dixon motor-chain compound.

Cross Oil Filter: Burt Mfg. Co., Akron, Ohio.

A booklet calling attention to the well-known Cross oil filter and giving a partial list of some of the leading users of this device.

Utility Spray Pump; Bamford & Smith Mfg. Co., Pascoag, R. I.

A booklet calling attention to the Utility pump for washing carriages, windows, sprinkling lawns, spraying trees, etc.

Oils Which Do Not Drip; New York & New Jersey Lubricant Co., New York City.

This is the name of a booklet issued by these manufacturers of non-fluid oils and contains valuable information regarding the means of obtaining the most efficient service from textile mill machinery at reduced cost for lubrication and maintenance.

Steam Turbines; Westinghouse Machine Co., East Pittsburg, Pa.

This is an illustrated catalogue of the Westinghouse-Parsons steam turbines and contains much valuable information on this method of generating steam power. It should be in the hands of every steam engineer and consumer of steam power. It begins with a comparison of steam and piston engines, followed by a detailed description of the turbine engine.

American Pioneer Pressed Steel Shaft Hanger; Standard Pressed Steel Co., Philadelphia, Pa.

A booklet describing and illustrating the various types of hangers and bearings manufactured by this company.

Graphite Pipe Joint Compound; Joseph Dixon Crucible Co., Jersey City, N. J.

A booklet calling attention to Dixon's graphite pipe joint compound which is a valuable graphite product for the use of engineers, machinists, pipe fitters, plumbers, etc.

Remodeling of a Power Plant.

The Canadian Rubber Co. of Montreal recently remodeled their power plant and found that the tall brick chimney, 110 feet high, would not give the proper amount of draft necessary in connection with the four new boilers they were to install. Mechanical draft was necessary and for this purpose a large Sturtevant steel plate fan driven by a Sturtevant horizontal engine was installed and now the proper amount of draft is easily attained and regulated at will regardless of the weather conditions. This installation is another illustration of the necessity of mechanical draft, especially in connection with the remodelling of old boiler plants.

Opportunities in Philadelphia.

J. Fred Dieterich, 737 Walnut St., Philadelphia, Pa., makes a specialty of manufacturing property in and about Philadelphia. He has a large tract of well located land which is offered at very advantageous terms and also many buildings suitable for textile industries of different kinds, and parties looking for locations or sites in this district would do well to send for his list.

The Ice is Out.

The magic word is passed—"the ice is out." The lumberman is happy; he sees the waters of the great Penobscot and Kennebec hurling and cracking the heavy ice-flows, and making open water for his logs in their journey city-ward. And the sportsman! Well, just imagine your own frame of mind, at the anticipation of pulling from a flowing stream or a crystal lake land-locked salmon, trout, togue, bass, carp, perch, pickerel, etc. Happy! why, the angler's nightmares and day-dream during April and May are a confusion of bait, rods, reels, lines, creels, trawls and canoes.

Fishing down in Maine means much more than a journey to a lake or river and casting a line. It means a trip through a section of wild forest lands, where the pines and hemlocks send forth a fresh aroma which invigorates and rejuvenates; the solitude which settles all about, broken only by the music of the birds and the sighing of the pine boughs will banish far the bustling memory of the tumultuous city. And sport! well, it doesn't take long to learn how to catch 'em, and whipping a trout stream or paddling a canoe, you'll experience the true joys of the angler's paradise.

To tell all about Maine's lakes and rivers and their varieties of fish would require a deal of time and space, but such popular resorts as Moosehead, Rangeley Lakes, Sebago Grand Lake, Belgrade Lakes and the waters of the Bangor, Aroostook and Washington County regions, tell the tale and speak for the eighteen hundred other lakes and ponds in the state. Sebago Lake is open first of all, and here are found the largest specimens of land-locked salmon in the state. Moosehead and the Rangeleys furnish trout and land-locked salmon galore, and the Belgrade lakes are famous the country over for their black bass. The waters of Washington County and the Bangor & Aroostook region are stocked with all the varieties known to the inland fisherman.

In New Hampshire, lakes Winnipesaukee and Sunapee and Newfound Lake take the lead; but there are hundreds of smaller ponds and lakes and numerous trout brooks besides. Vermont has Champlain, Memphremagog and Willoughby, all prolific haunts; while away over the border line in Quebec, New Brunswick and Nova Scotia are many famous resorts. For two cents in stamps, the Boston & Maine Passenger Department, Boston, will send their illustrated booklet, "Fishing and Hunting," which describes the fishing and gaming section of northern New England and Canada; also another booklet, invaluable to the sportsman, with the fish and game laws for 1904 of Maine, New Hampshire, Vermont, Massachusetts, Quebec, Nova Scotia, New Brunswick and Newfoundland.

Sykes & Hall.

Messrs. Sykes & Street announce that on April 1st, 1904, their Philadelphia branch house was succeeded by Messrs. Sykes & Hall, who assume the management of their business in the Middle and Southern States under the immediate supervision of their Mr. William M. Hall, who for many years has been associated with them at New York and Boston. The Philadelphia address is 215 Chestnut St., and Messrs. Sykes & Hall announce that deliveries may be made as usual, f. o. b. New York or Philadelphia as may best suit the convenience of customers.

Another Novelty in Train Schedules.

About two years ago the New Jersey Central inaugurated a schedule of hourly trains between New York and Philadelphia, a train leaving either city every hour from 7.00 a. m. to 6.00 p. m. and so successful was the scheme that the management has decided to put in operation a similar schedule between New York and Washington, only that trains will leave every other hour from either city—that is at 8.00, 10.00 a. m., 12.00, 2.00, 4.00, 6.00 and 7.00 p. m. from New York and at 7.00, 9.00, 11.00 a. m., 1.00, 3.00, 5.00, 7.00 p. m. from Washington.

An equipment of coaches, parlor, sleeping and dining cars similar to that in use in the Philadelphia service will be used on the New Royal Blue line, which with a fine road bed and the shortest route will make the line one of the most popular south.

The Richard Borden Mfg. Co., Fall River, Mass., will take advantage of the curtailment to make improvements in their No. 2 boiler house with view to introducing a Green economizer there. The placing of the contract was doubtless influenced by the work of the present machine which has been in service for three years at their No. 1 Mill.

The Troy Cotton & Woolen Mfg. Co., Fall River, Mass., have executed a contract with Mr. H. G. Brinckerhoff, New England agent of the Green Fuel Economizer Co., 53 State St., Boston, for a large machine of their well-known specialty.

Sibson & Stern, Inc., of Germantown, Philadelphia, Pa., manufacturers of lace trimmings for the underwear trade, have just purchased a property on Stenton Ave., Germantown, one block north of Wayne Junction, on which they propose erecting a mill to double the capacity of their present plant.

A Good Opportunity in Philadelphia.

It may be of interest to any manufacturer looking for a good site with railroad facilities in Philadelphia, to note the sale of the Allegheny Ave. tract at the salesrooms of Samuel T. Freeman & Co., 12th and Walnut Sts., on Wednesday, May 25th. As the sale is in partition proceedings, under authority of the Court of Common Pleas, the opportunity for picking up a bargain is one that should not be neglected.

The Joseph Dixon Crucible Co.

The annual meeting of the stockholders of the Joseph Dixon Crucible Company was held at the Company's main office, Jersey City, N. J., Monday, April 18, and out of a possible vote of 7,345 shares, there were 7,126 shares voted for the re-election of the old board, consisting of Edward F. C. Young, John A. Walker, William Murray, George T. Smith, Edward L. Young, George E. Long and Joseph D. Bedle. President E. F. C. Young; Vice-Pres. and Treasurer John A. Walker; Secretary Geo. E. Long, were re-elected by the directors. Judge Joseph D. Bedle was also re-elected as counsel.

Freedom from Spontaneous Combustion.

In their advertisement for this month, the Borne, Scrymser Company brings out a point about wool oiled with Breton oil which is well worth noting; viz., that it has no affinity with oxygen, and, therefore, gives entire security from spontaneous combustion. Besides that the stock does not gum up if it is not immediately used after oiling. There are instances where it has laid in bins for a number of months after oiling and then been carded and spun as well as the day it was oiled. This company brings out some new point about Breton oil in each issue of their advertisement, which is well worth the attention of manufacturers and carders.

To Visit Foreign Agents.

Mr. W. F. Warden, president and general manager of the Burt Manufacturing Co., makers of the Cross oil filter and the Burt exhaust head, Akron, Ohio, sailed for Europe from New York, April 15.

Mr. Warden goes in the interest of his company, which has a large foreign trade in all the principal countries of the world; in fact, there is not a place on the globe where lubricating oils are used and steam plants are in evidence that the Burt Manufacturing Co., and their Cross oil filter and Burt exhaust head have not been adopted.

Mr. Warden will confine this trip to visiting agents of his company in England, France, Germany, Belgium, Norway, Sweden, Denmark, Russia, and if time permits he will visit those in Switzerland, Greece and Spain.

In his absence J. Asa Palmer, secretary of the company, will have full direction of affairs.

Among the many large foreign orders received in the past few days is one from Durban, South Africa, for thirty gross of oil filters, and one from St. Petersburg, Russia, for oil filters for the Russian government.

The Burt Manufacturing Co., have issued an interesting picture, showing a thirty-inch exhaust head they recently made for the Jones and Laughlin Steel Company, Pittsburg. This exhaust head is ten feet high; nine feet four inches in diameter; and weighs two thousand and seven hundred pounds.

The Springstein Mills, at Chester, S. C., are installing in induced draft apparatus of the American Blower Co.'s make, through A. H. Washburn, Charlotte, their Southern representative.

Removal of Offices.

The Kennicott Water Softener Co. has removed to new offices in Railway Exchange Building Jackson and Michigan Boulevards, Chicago. This is one of the latest and most modern of the new office buildings in Chicago, located on the lake front.

The General Electric Co. now has 73,000 horsepower in use or under contract in textile mills, an increase of 13,000 horse-power within a very short time comparatively. The use of electricity in the textile industry is extending very rapidly as its advantages become more appreciated by manufacturers. Most of the modern new mills are so equipped.

Change of New York Office.

The Geigy Aniline & Extract Co., whose New York office has heretofore been located at numbers 104 to 106 Murray St., announces its removal to new quarters at 69 Barclay Street, between West Broadway and Greenwich St., New York.

St. Louis Exposition Opens April 30.

On date of April 30th the gates of the Exposition Grounds at St. Louis will be thrown open; the button will have been pressed by no less a personage than President Roosevelt. The machinery will immediately be set in motion, and the grandest, most gorgeous and most stupendous exposition which the world has ever witnessed will be a reality.

It is a world in itself, and what a cosmopolitan affair! Filipinos and Greeks, Romans and Africans, in fact natives from almost every portion of the earth's surface are there; and the buildings have an architectural beauty which will prove a treat to the beholder. Industry and art, modern and ancient, of every conceivable form will be presented. And the glorious "Old Pike," why the midway at Chicago's World's Fair was but a side-show in comparison! The St. Louis Exposition may be termed a marvel, for its exhibits can scarcely be imagined. A very accurate idea of the exposition, however, can be gleaned from the beautiful booklet of 40 pages, which contains illustrations and an elegant map of the grounds, and which will be mailed free by the General Passenger Department, Boston & Maine Railroad, Boston, to any person upon receipt of address.

The American Ship Building Co. have given a second order for Cross oil filters for their yards at Lorain, O.

Fisher Feeds Giving Satisfaction.

The eight special Fisher card feeds built by the Woonsocket Machine & Press Co. of Woonsocket, R. I., for the Arlington Mills, Lawrence, Mass., have been running very satisfactorily. These mills now have about fifty Fisher feeds of various sizes.

Recent Textile Patents.

BLEACHING MATERIALS, APPARATUS for Electrically. 756,745. August A. Vogelsang, Dresden, Germany, assignor to Charles Martin, Nottingham, England.

BRAIDING MACHINE. 757,423. John P. Swift, Pawtucket, R. I., assignor of three-fourths to Adam Sutcliffe, Pawtucket, R. I.

CARPET SURFACE, Machine for Trimming Pile. 755,803. Benjamin S. Smith, Paisley, Scotland.

CARPET WINDER. 756,132. Alvin W. Munson and Arthur S. Dornblaser, Hagarstown, Md.

CLOTH CUTTER. 756,501. Solomon R. Jacobs, New York, N. Y.

DYEING APPARATUS, Automatic. 757,478. James Marshall, Fall River, Mass.

EXPANSION COMB for Warping, Beaming or Other Machines. 755,738. Albert E. Brooks, Lowell, Mass., assignor to T. C. Entwistle Co., Portland, Me.

FIBROUS MATERIALS, Machine for Compressing. 756,099. James T. Cowley, Boston, Mass.

FIBROUS PLANTS, Machine for Disintegrating. 755,931. M. Prieto, Mexico, Mexico.

LOOM. 755,715. Harry W. Smith, Worcester, Mass.

LOOM. 756,334. George S. Cox, Fitzwatertown, Pa., assignor to himself and Walter S. Cox, Philadelphia, Pa.

LOOM DOBBY Leno Motion. 757,085. John B. Bolton, Easthampton, Mass.

LOOM HEDDLE Movement, Hand Operated. 756,235. Adam S. Horlacher, Indianapolis, Ind.

LOOM PICKER Mechanism. 757,043. Godfroid Jolicoeur, Augusta, Me.

LOOM FOR WEAVING Cartridge Belt Fabrics. 757,102. William C. Fisher, Middletown, Conn., assignor to Russell Manufacturing Co., Middletown, Conn.

LOOM WEFT Replenishing Mechanism. 755,720. Ridley Starkie, Burnley, England.

MEASURING AND EXAMINING Machine, Cloth. 756,146. Peter P. Schramek, St. Louis, Mo., assignor of one-half to Louis P. Korach, St. Louis, Mo.

MERCERIZING APPARATUS. 755,716. Robert P. Smith and George E. Drum, Philadelphia, Pa.

MERCERIZING MACHINE. Yarn. 755,765. Paul Hahn, Niederlahnstein, Germany.

NAPPING MACHINE. 756,029. Maxim La Fountain, Jr., Lawrence, Mass., assignor to Davis & Furber Machine Co., North Andover, Mass.

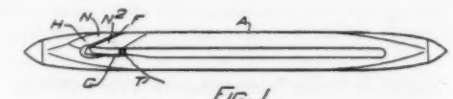
OXIDIZING AND DRYING Textile Material. Apparatus for. 757,104. John W. Fries, Winston-Salem, N. C.

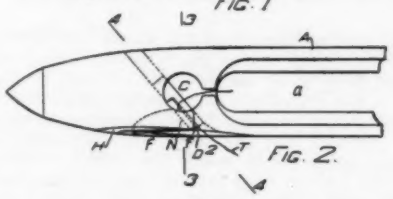
RUGS. MANUFACTURING Weft for. 756,236. Adam S. Horlacher, Indianapolis, Ind.

SCOURING MACHINE for Woven Fabric. 757,148. Jean Schweiter, Horgen, Switzerland.

SHUTTLE, Self-Threading. 756,592. Jean Baptiste Daudelin, Fall River, Mass.

This invention relates to shuttles, particularly to that class known as "self-threading," in which the thread is brought into the threading-eye through a passage so arranged as to prevent its subsequent escape therefrom.





It is the object of the present invention to provide a shuttle which will be light, well balanced, cheap, strong, and durable. The cumbersome and expensive plates commonly in use have been dispensed with and the object attained by a simple arrangement of the delivery-eye and threading-slots.

SKIRTS, WOVEN Interlining for. 756,215. George S. Cox, Fitzwatertown, Pa., assignor to himself and Walter S. Cox, Philadelphia, Pa.

SPINNER. 756,542. Henry F. Stimps, Chicago, Ill.

SPINNING APPARATUS, Yarn. 756,166. Joel Hayden, Scituate, R. I., assignor to Boston Spinning Ring Co., Portland, Me.

SPOOL RACK. 756,790. Adam S. Horlacher, Indianapolis, Ind.

WARP DRAWING Machine. 755,861. Millard F. Field, Boston, Mass., assignor to John Clark, trustee, Boston, Mass.

WEIGHING AND SORTING Skeins of Yarn, Apparatus for. 756,862. Alfred Lehner, Zurich, Switzerland.

WINDING MACHINE Stop Motion. 756,001. Thomas Cooper, Kidderminster, England, assignor to Crompton & Knowles Loom Works, Worcester, Mass.

WINDING MACHINE, Yarn. 756,014. Lyman O. Goodwin, North Andover, Mass., assignor to Davis & Furber Machine Co., North Andover, Mass.

WOVEN FABRIC. 756,150. William M. Stevenson. Indian Orchard, Mass.

WOVEN FABRIC. 753,702. Charles H. L. Hanson, Philadelphia, Pa., assignor to John H. Bromley and Edward Bromley, Philadelphia, Pa.

YARN GUIDE Holding Mechanism. 753,625. John E. Prest, Worcester, Mass.

YARN SKEIN Delivering Apparatus. 754,584. Walter Mathesius, Hoerde, Germany.

C. E. RILEY & CO.

65 Franklin Street, BOSTON, MASS.

BUILDERS AND IMPORTERS OF

COTTON WOOLEN WORSTED

MACHINERY

AGENTS FOR

HOWARD & BULLOUGH, Ltd., Picking, Revolving Flat Cards, Electric and Mechanical Stop Motion Drawing, Slubbing, Intermediate, Roving and Jack Frames, Spinning and Twisting, New Patent Self-Acting Mules, Spoolers, Warpers and Slashers,

RICHARD THRELFALL, Patent Fine Spinning Mules, 100s to 350s.

HALL & STELLS, Worsted Machinery.

CONSTRUCTION DE MACHINES, Ci-Devant, F. J. Grun. French Worsted Machinery.

HOYLE & PRESTON, Noble Combs, Back Washing Machines, etc.

JAMES TOMLINSON, Ltd., Cotton Waste Machinery; Engine Cleaning and Hard Waste Breaking Machines, etc.

JOHN HAIGH & SONS, Ltd., Woolen and Worsted Cards, Fearnoughts, Feeds, etc,

THOS. BROADBENT & SONS, Hydro Extractors, Patent Suspended Steam and Electrical Driven, Machines kept in stock in Boston.

JOHN WHITELEY & SONS, Card Clothing for Cotton; Tempered Steel, Plough Ground, Needle Pointed.

L. M. TETLOW & SONS, Card Clothing for Woolen and Worsted; Tempered Steel, Needle Pointed.

J. GREENHALGH & SONS, Cotton Waste Willows, for Fly, Strips, Picker Droppings, etc.

DRONSFIELD BROS., Ltd., Grinding Rolls and Emery Filleting. Stock kept in Boston.

SPINDLES, FLYERS, FLUTED ROLLS, ETC.

DIRECT .. .. IMPORTERS OF **EGYPTIAN COTTON**

You can run your belts tight with Cling-Surface or you can run them slack, as you like; but you can't run them slack without Cling-Surface for they slip even when they are tight.

Mr. C. M. Benson (late of Valley Mills, Cherry Valley, Mass., and now Treas. Powhattan Mfg. Co., Chester, Pa.) says: "I have started 48-inch cards from a dead start without any slippage of belt on cylinder pulley."

Cling-Surface pays every day. Place a trial order and see for yourself.

Cling-Surface Manufacturing Co

199-205 Virginia Street Buffalo N Y

Boston 170 Summer St New York 39 Cortlandt St

Philadelphia The Bourse

LUNKENHEIMER REGRINDING VALVES

ARE the embodiment of perfection and represent the best value in valve quality. On the market for almost half a century. Quality always uniform. Liberally used and in continuous service in the United States Navy, locomotives, lake and river boats and high pressure power plants. No pressure too high or service too severe for a Lunkenheimer Valve. If you want absolutely reliable valves, specify "*Lunkenheimer*" and order from your dealer. Write for catalog.

THE LUNKENHEIMER COMPANY

Largest Manufacturers of Engineering Specialties in the World,

CINCINNATI, OHIO. Branches { New York, 26 Cortlandt St. London, 35 Great Dover St.

Buyers' Index.

The addresses of builders of mill machinery and dealers in mill supplies, whose names appear in the following classified index, may be found upon referring to their advertisement. The Alphabetical Index to advertisers follows this classified list. Buyers who are unable to find in these classified lists such machinery or supplies as they desire, are invited to communicate with the publishers, who can, in all probability, refer them to proper sources.

Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

Accident Cabinets.
Putnam & Co.

Air Moistening System.
American Moistening Co.

Architects and Mill Engineers.
Ballinger & Perrott.
Dean & Main.
Ferguson, John W.
Patterson, H. C.
Stearns & Castor.
Suck, Adolph.

Asphalt and Concrete.
Warren Bros. Co.

Automatic Feeds for Cotton and Wool.
American Drying Machinery Co.
Harwood, Geo. S. & Son.
Leigh, Evan A.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Schofield, Wm. Co.
Smith, Jas., Woolen Machinery Co.
Woonsocket Machine & Press Co.

Automatic Shuttle and Loom Attachments.
Asala Co.

Balling Machine.
North Chelmsford Machine Co.
Torrance Mfg. Co.

Bandings.
——See under Yarns.

Baskets.
Ballou Basket Works.
Lane, W. T. & Bro.
Morris & Co.

Belting.
Houghton, E. F., Co.
Jeffrey Manufacturing Co.
Main Belting Co.
Shultz Belting Co.
Smith, Jas., Woolen Mach. Co.
——See also Mill Supplies.

Belt Dressing.
Cling Surface Mfg. Co.
Dixon, Jas., Crucible Co.
Houghton, E. F., Co.
Stephenson Mfg. Co.

Belt Lacing Machines.
Diamond Drill & Machinery Co.

Bindings.
——See Tapes and Braids.

Bleaching Kiers.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Wks.)
Textile Finishing Machinery Co.

Bleaching Materials.
Bosson & Lane.
Roessler & Hasslacher Chemical Co.

Blowers and Blower Systems.
American Blower Co.
Barney Ventilating Fan Works.
Boston Blower Co.
Buffalo Forge Co.
Hartford Blower Co.
Mass. Fan Co.
Parsons Mfg. Co.
Philadelphia Drying Machinery Co.
Sturtevant, B. F., Co.
Schnitzler, Chas. H.

Bobbin Covers.
Kolb, Frank E.

Bobbins, Spools, Shuttles, Etc.
Leigh, Evan A.
Sweet & Doyle.
Tebbets, E. L. & Co.

Boilers.
——See Steam Boilers.

Boiler Arches, "Steel Mixture."
McLeod & Henry.

Boiler Furnace Equipment.
Parsons Mfg. Co.

Boiler Setting.
Harris, J. B.

Boxes, Cloth Boards, Etc.
Pearson, J. T.

Boxes (Paper).
——See Paper Boxes.

Braiding Machinery.
New England Butt Co.
Textile Machine Works.

Braids.
——See Tapes, Braids and Edgings.

Brass (Perforated).
——See under Perforated Metal.

Brooms.
Philadelphia Broom Co.

Brushes.
Felton, S. A. & Son Co.
Mason Brush Works.

Brushers.
——See Napping Machines.

Burr Pickers.
Curtis & Marble Machine Co.
Sargent's, C. G., Sons.
Smith, Jas., Woolen Machinery Co.

Burlaps.
Stoddard, Haserick, Richards & Co.

Calico Printers' Machinery and Supplies.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Wks.)
Butterworth, H. W. & Sons Co.
Taunton, New Bedford, Copper Co.
Textile Finishing Mchry. Co.
——See also Dyeing, Bleaching, Machinery, etc.

Canvas Baskets.
Ballou Basket Works.
Lane, W. T. & Bro.
Morris & Co.

Carbonizing.
Riverdale Woolen Co.

Carbonizing Machinery.
American Drying Machinery Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Sargent's, C. G., Sons.
Smith, Jas., Woolen Machinery Co.

Card Clothing.
Ashworth, Elijah.
Leigh, Evan A.
Riley, C. E. & Co.
Smith, Jas., Woolen Machinery Co.
Stoddard, Haserick, Richards & Co.

Card Feeds.
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Card Grinding Machinery.
Entwistle, T. C., Co.
Leigh, Evan A.
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Riley, C. E. & Co.
Smith, Jas., Woolen Machinery Co.
Stoddard, Haserick, Richards & Co.

Carders' Tools.
Brown, W. H.

Carpet Machinery.
Altemus, Jacob K.
Curtis & Marble Machine Co.
Howard Foundry & Mch. Wks.
Philadelphia Textile Machinery Co.
Smith, Jas., Woolen Machinery Co.

Castings.
Schofield, Wm., Co.

Chemicals.
Fiedt, Geo. D. & Co.
Roessler & Hasslacher Chemical Co.
Solvay Process Co.

Chemists.
Grasselli Chemical Co.
Little & Walker.

Cling Surface.
Cling Surface Mfg. Co.

Clocks.
Pettes & Randall Co.
Riggs & Brothers.

Cloth Boards.
Chaffee Bros.
Pearson, J. T.

Cloth Stretchers.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Wks.)
Textile Finishing Machinery Co.

Clutches.
American Tool & Machine Co.
Hunter, James, Machine Co.
Reeves Pulley Co.
Smith, Jas., Woolen Machinery Co.

Combs (Wool and Cotton).
Hood, R. H.
Leigh, Evan A.
Philadelphia Textile Machinery Co.
Riley, C. E. & Co.
Smith, Jas., Woolen Machinery Co.
Stoddard, Haserick, Richards & Co.
Townsend, Thomas.

Combustion System.
Harris, J. B.

Conveyors, Pneumatic.
——See Blowers & Blower Systems.

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Jeffrey Manufacturing Co.

Cop Tubes.
——See Paper Tubes.

Copper (Perforated).
——See under Perforated Metal.

Copper Print Rollers.
Taunton, New Bedford Copper Co.

Coppersmiths.
Beer, Paul.
Badger, E. B. & Sons Co.

Copper Work for Dyers.
Butterworth, H. W. & Sons Co.
Textile Finishing Machinery Co.

Cotton.
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Charles, W. B.
Riley, C. E. & Co.
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Cotton Elevators.
Buffalo Forge Co.

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American Drying Machinery Co.
Ashworth, Elijah.
Barker, James.
Butterworth, H. W. & Sons Co.
Crompton & Knowles Loom Works.
Crompton-Thayer Loom Co.
Cohoes Foundry & Machine Co.
Curtis & Marble Machine Co.
Draper Company.
Easton-Burnham Co.
Elliott & Hall.
Entwistle, T. C., Co.
Firth, William, Co.
Houghton, L. T.
Howard & Bullough American Mach. Co.
Kilburn, Lincoln & Co.
Kitson Machine Co.
Leigh, Evan A.
Lowe, Stephen C.
Lowell Machine Shop.
Mason Machine Works.
Metallic Drawing Roll Co., The.
North Chelmsford Machine Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Riley, C. E. & Co.
Saco & Pettee Machine Shops.
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Schofield, Geo. L.
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Whitin Machine Works.
Woonsocket Machine & Press Co.

Cotton Openers and Lappers.
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Kitson Machine Co.
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Stoddard, Haserick, Richards & Co.

Cotton Softeners.
Bosson & Lane.

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Becker, C. W.
Blaisdell, S., Jr., Co.
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Crayons.
Dixon, Jos., Crucible Co.
Lowell Crayon Co.

Cutters for Knit Fabrics.
Kennedy, Thos. (Cutters, etc.).
Universal Cutter Co.

Dating and Time Stamps.
Riggs & Brothers.

Dextrine.
Stein, Hirsh & Co.

Dobbies.
Crompton & Knowles Loom Works.
Crompton-Thayer Loom Co.

Drawing Rolls.
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Metallic Drawing Roll Co., The.

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American Drying Machinery Co.
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Birch Bros. Co. (Somerville Mchn. Wks.)
Boston Blower Co.
Buffalo Forge Co.
Butterworth, H. W. & Sons Co.
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Hunter, Jas., Machine Co.
Kenyon, D. R. & Son.
Mass. Fan Co.
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Philadelphia Textile Machinery Co.
Power Specialty Co.
Sargent's, C. G., Sons.
Smith, Jas., Woolen Machinery Co.
Somerville Mach. Wks.
Sturtevant, B. F., Co.
Textile Finishing Machinery Co.
Whiteley, William, & Sons, Ltd.
Whittle, Jas. H.

Drying Boards.
Bull, William C.
Pearson, J. T.

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Dust Collectors.
Allington & Curtis Mfg. Co.
Hartford Blower Co.
Philadelphia Drying Machinery Co.

Dyers, Bleachers and Finishers.
Blissville Mills.
Brophy's, T., Sons.
Cranston Worsted Mills (yarns).
Davidson, J. F.
Drexler, W. M. & Co.
Firth & Foster Co.
Greenwood, R. & Bault.
Home Bleach & Dye Works.
Ingrahamville Dye Works.
Keystone Fast Black Dye Works.
Lorimer's, The Wm. H. & Sons Co.
Maryland Bleach & Dye Works.
Molt Bros. (Indigo Blue).
Pawtucket Dyeing & Bleaching Co.
Pennypack Yarn Finishing Co.
Providence Mills Mfg. Co.
Rowland, Samuel.
Washington Mfg. & Bleaching Co.

Dyeing, Drying, Bleaching and Finishing Machinery.
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American Drying Machinery Co.
American Yarn Dyeing Machine Co.
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Birch Bros. Co. (Somerville Mchn. Wks.)
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Curtis & Marble Machine Co.
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Fabric Measuring & Packaging Co.
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Heathcote, John & Son.
Hopkins Machine Works.
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Wing, L. J., Mfg. Co.

Dye House Cans.
Hill, James, Mfg. Co.

Dye Sticks.
Bailey, Frank.
Haedrich, E. M.

Dyestuffs and Chemicals.
Atteaux, F. E. & Co.
Berlin Aniline Works.
Bischoff & Co.
Bosson & Lane.
Cassella Color Co.
Dillon & Co.
Dubois, A. N.
Grasselli Chemical Co.
Kalle & Co.
Farbenfabriken of Elberfeld Co.
Ford, J. B., Co.
Fortner, L. B.
Geigy Aniline & Extract Co.
Geisenheimer & Co.
Holliday & Sons, Ltd.
Johnson, Chas. A. & Co.
Kuttroff, Pickhardt & Co.
Leyland, Thos. & Co.
Metz, H. A. & Co.
Molt Bros. (Indigo Blue).
N. Y. & Boston Dyewood Co.
Roessler & Hasslacher Chemical Co.
Selling Co., The.
Solvay Process Co.
Sykes & Street.
Thayer, Ed. M.
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Dynamos and Motors.
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General Electric Co.
Mechanical Specialty Co.
Sturtevant, B. F., Co.

Edgings.
——See Tapes, Braids and Edgings.

Electrical Construction.
Bullock Electric Mfg. Co.
General Electric Co.
Mechanical Specialty Co.
Westinghouse Electric & Mfg. Co.

Electric Fans.
American Blower Co.
Buffalo Forge Co.
Bullock Electric Mfg. Co.
General Electric Co.
Hartford Blower Co.
Mass. Fan Co.
Mechanical Specialty Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Sturtevant, B. F., Co.
Westinghouse Electric & Mfg. Co.

Electric Lamps.
Sterling Electric Mfg. Co.

Electric Lighting.
Bullock Electric Mfg. Co.
General Electric Co.
Westinghouse Electric & Mfg. Co.

Electric Motors.
Bullock Electric Mfg. Co.
General Electric Co.
Mechanical Specialty Co.
Sturtevant, B. F., Co.
Westinghouse Electric & Mfg. Co.

Electrotyping and Printing.
Smith Bros.
Whitcomb, H. C. & Co.

Elevators.
Cohoes Foundry & Machine Co.
Howard Foundry & Mch. Wks.
Jeffrey Manufacturing Co.
Morse, Williams & Co.
Salem Elevator Works.

Embroidering Machine.
Ahlstrom, O. J.

Employees' Time Recorders.
Pettes & Randall Co.
Riggs & Brothers.

Exhaust Heads.
Burt Manufacturing Co.
Hartford Blower Co.
Pittsburgh Gage & Supply Co.
Sturtevant, B. F., Co.

Fans—Exhaust and Ventilating.
——See Ventilating Apparatus.

Feed Water Heaters.
Green Fuel Economizer Co.
Scaife, W. B. & Sons.

Feed Water Pumps.
Goulds Mfg. Co.
Pittsburgh Gage & Supply Co.
Scaife, W. B. & Sons.

Feed Water Purifiers.
Philadelphia Water Purification Co.

Feeds.
——See Automatic Feeds.

Filters.
Norwood Engineering Co.
Phila. Water Purification Co., The.
Pittsburgh Gage & Supply Co.
Scaife, W. B. & Sons.

Finishing Machinery.
——See Dyeing, Drying, Bleaching and Finishing.

Fire Box Blocks, "Steel Mixture."
McLeod & Henry Co.

Fire Brick.
Borgner, Cyrus, Co.
McLeod & Henry.

Fire Extinguishers.
Badger, E. B. & Sons Co.

Fire Hose.
Eureka Fire Hose Co.

Fire Hydrants.
Norwood Engineering Co.

Fire Proof Doors and Windows.
Lupton's, David, Sons Co.

Flax, Tow, Hemp and Jute Machinery.
Haskell-Dawes Mach. Co.
Lawson, Samuel & Sons.
Leigh, Evan A.

Fluted Rolls.
Hood, R. H.
Leigh, Evan A.
Riley, C. E. & Co.
Thurston, A. G. & Son.

Flyers.
Leigh, Evan A.
Textile Machinery Co.

Forges.
Buffalo Forge Co.
Sturtevant, B. F., Co.

Forwarders.
McKeon, John F.

Friction Clutches.
——See Clutches.

Friction Cones.
Evans, G. Frank.

Fuel Economizers.
Green Fuel Economizer Co.
Parson Mfg. Co.

Furnace for Boilers.
Harris, J. B.
Parson Mfg. Co.

Fulling Mills for Woolen Goods.
Hopkins Machine Works.
Hunt, Rodney, Machine Co.
Hunter, Jas., Machine Co.
Kenyon, D. R. & Son.

Garnetts.
Leigh, Evan A.
Philadelphia Textile Machinery Co.
Smith, Jas., Woolen Machinery Co.

Gas Engines.
Jones, Lewis.

Gas Exhausters.
Hartford Blower Co.
Sturtevant, B. F., Co.

Gauges.
Crosby Steam Gage & Valve Co.
Lunkenheimer Co.
Pittsburgh Gage & Supply Co.
Walworth Manufacturing Co.

Gears.
Horsburgh & Scott.
New Process Raw Hide Co.

Gear Cutting Machine.
Whiton, The D. E., Co.

Generating Sets.
Buffalo Forge Co.
Sturtevant, B. F., Co.

Grate Bars.
Parsons Mfg. Co.

Grids for Cotton Openers.
Schaellibaum, Robert, Company.

Heating.
——See Ventilating.

Heddles.
Smith, Jas., Woolen Machinery Co.
Stoddard, Haserick, Richards & Co.

Hosiery Boards.
Pearson, J. T.

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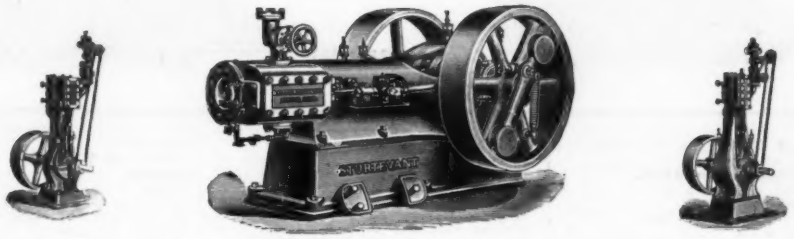
10000

Sturtevant Engines



Are in use throughout the World . . . .

We build all types and sizes from 2 to 400 H. P.

B. F. Sturtevant Co.

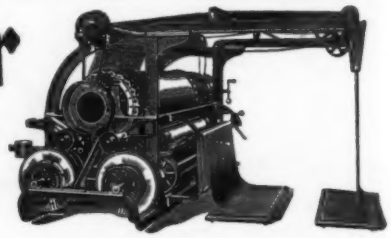
Boston, Mass.

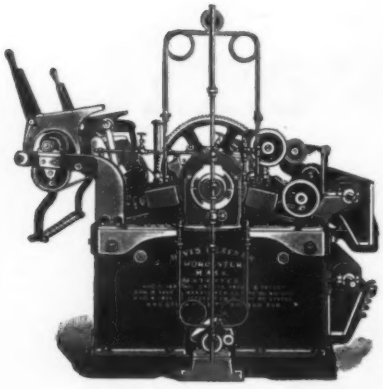
New York. Philadelphia. Chicago. London.

357

David Gessner

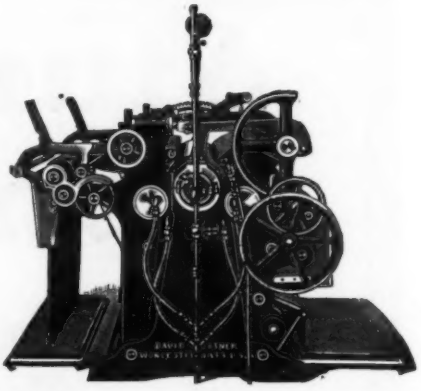
Worcester, Mass.





Latest Improved Cloth Finishing Machinery

Napping Machines and Presses a Specialty



Hoists and Hoisting Machinery.
Larrabee, John E.

Humidifying Apparatus.
American Air Moistening Co.

Hydro Extractors.
American Tool & Machine Co.
Riley, C. E. & Co.
Stoddard, Haserick, Richards & Co.
Textile Finishing Machinery Co.
Whiteley, William, & Sons, Ltd.
Whittle, Jas. H.

Injectors.
Lunkenheimer Co.

Ironing Machines for Knit Goods.
Craw, J. W., Laundry Machinery Co.

Jacquards.
Halton's, Thomas, Sons.

Knit Goods, Edgings, Trimmings, Etc.
Cathcart, John & Co.
Chapin, Geo. W.
Charles, W. B.
Cheney Bros.
Friedberger Mfg. Co.
Hepner & Horwitz.
Krout & Fite Mfg. Co.
Weimar Bros.

Knit Goods Finishing Machines, Crochet, Etc.
Craw, J. W., Laundry Machinery Co.
Merrow Machine Co., The.
Nye & Tredick Co.
Scott & Williams.
Willcox & Gibbs Sewing Machine Co.

Knitting Machine Cylinders.
Paxton & O'Neill.
Ruth Automatic Knitting Machine Co.
Stafford & Holt.
Stanton & Lewis.

Knitting Machinery.
American Knitting Machine Co.
Branson Machine Co.
Brinton, H. & Co.
Claes & Flentje.
Cooper, Chas.
Crane Mfg. Co.
Excelsior Knitting Machine Mfg. Co.
Irmscher & Co.
Jenckes, E., Mfg. Co.
Jones, Lewis.
Kennedy, Thos. (Cutters, etc.).
Keystone Knitting Machine Mfg. Co.
Lamb Knitting Mach. Mfg. Co.
Leighton Machine Co.
Lindley, Geo. W.
Mayo Knitting Machine & Needle Co.
McMichael, A.
McMichael & Wildman Mfg. Co.
Mueller, Arthur.
Muller, Julius.
National Automatic Knitter Co.
Newton, E. A.
Nye & Tredick Co.
Paxton & O'Neill.
Pepper Machine Works.
Richter, Wolfgang.
Ruth Automatic Knitting Machine Co.
Schoebel, Walter.
Scott & Williams.
Seyfert & Donner.
Stafford & Holt.
Standard Machine Co.
Taylor, James.
Tompkins Bros.
Walther, Otto.

Knitting Needles and Supplies.
Breedon's, Wm., Son.
Brinton, H. & Co.
Cooper, Chas.
Corey, Wm., Co.
Crane Mfg. Co.
Dodge Needle Co.
Freeman Bros.
Ives, Loyal T.
Keystone Knitting Machine Mfg. Co.
Kolb, Frank E.
Lamb Knitting Machine Mfg. Co.
Manufacturers' Supplies Co.
Mayo Knitting Machine & Needle Co.
Page Needle Co.
Ruth Automatic Knitting Machine Co.
Treat, Orion.
Wardwell Needle Co.

Labeling Machines.
Beck, Chas., Paper Co., Ltd.

Laboratory Outfits.
Feidt, Geo. D. & Co.

Leather.
Houghton, E. F., Co.

Looms.
Asala Co.
Crompton & Knowles Loom Works.
Crompton-Thayer Loom Co.
Draper Company.
Howard Fndy. & Mch. Wks. (For Wire).
Kilburn, Lincoln & Co.
Leigh, Evan A.
Lowell Machine Shop.
Mason Machine Works.
Smith, Jas., Woolen Machinery Co.
Stoddard, Haserick, Richards & Co.
Whitin Machine Works.

Loopers.
Hepworth, John W. & Co.
Leighton Machine Co.

Lubricators.
Borne, Scrymser Co.
Dixon, Jos., Crucible Co.
Lunkenheimer Co.
Pittsburgh Gage & Supply Co.

Lumpers.
Gerry, George & Son.
Schofield, Wm. Co.

Machinery Dealers.
Jefferson, Ed. & Bro.
Lamb, J. K., Textile Mach. Co.
Pittsburgh Gage & Supply Co.
Schofield, Geo. L.
Taylor, James.

Machinists' Tools.
Whiton, The D. E. Co.
Walder, J.

Mails.
Curtis & Marble Machine Co.

Measuring and Folding Machines.
Elliott & Hall.
Fabric Measuring & Packaging Co.

Mechanical Draft.
American Blower Co.
Boston Blower Co.
Buffalo Forge Co.
Hartford Blower Co.
Massachusetts Fan Co.
Sturtevant, B. F., Co.

Alphabetical Advertising Index, with page numbers, follows this list.

The New

Crompton-Thayer Loom Company

.. MANUFACTURERS OF ..

FANCY LOOMS

For Weaving Worsted and Woolen, Fancy Cottons and Silk Fabrics.

Dobbies, Box Motions and Supplies.

WORKS AND OFFICES:

677 Cambridge Street, Worcester, Mass.

Mechanical Engineers.
American Blower Co.
Buffalo Forge Co.
Dean & Main.
Freeman, Walter K.
Hartford Blower Co.
Philadelphia Drying Machinery Co.
Sturtevant, B. F., Co.
Suck, Adolph.

Mercerisers.
Blissville Mills.
Greenwood & Bault, R.
Home Bleach & Dye Works.
Lorrimer, Wm. H., Sons Co.
Pennypack Yarn Finishing Co.

Mercerising Machinery.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Works).
Butterworth, H. W., & Sons.
Klauder-Weldon Dyeing Machine Co.
Niederlahnsteiner Maschinenfabrik.
Smith, Drum & Co.
Textile Finishing Machinery Co.
Whiteley, William, & Sons, Ltd.

Mill Architects.
——See Architects and Mill Engineers.

Mill Brushes.
——See Brushes.

Mill Builders and Engineers.
Ferguson, John W.

Mill Sewing Machines.
——See Sewing Machines and Supplies.

Mill Supplies.
American Supply Co.
Bamford & Smith.
Barker, James.
Buckley's, Benj., Son., Gun Mill.
Crosby Steam Gage and Valve Co.
Dixon Lubricating Saddle Co.
Easton-Burnham Co.
Eureka Fire Hose Co.
Hartford Blower Co.
Houghton, E. F., Co.
Jefferson, Ed., & Bro.
Jeffrey Manufacturing Co.
Johnson Novelty & Mill Supply Co.
Kolb, Frank E.
Lane, W. T., & Bro.
Larrabee, John E.
Leigh, Evan A.
Main Belting Co.
Morris & Co.
Murphy, E. W., & Co.
Pairpoint Mfg. Co.
Philadelphia Drying Machinery Co.
Philadelphia Broom Co.
Pittsburgh Gage & Supply Co.
Putnam & Co.
Riley, C. E., & Co.
Richardson Bros.
Shaw, Victor, Ring Traveler Co.
Smith, Jas., Woolen Machinery Co.
Stephenson Mfg. Co.
Stoddard, Haserick, Richards & Co.
Sweet & Doyle.
Thurston, A. G., & Son.
Tucker, W. W. & C. F.
Ward & Vandegrift.
Walworth Manufacturing Co.

Mill Trucks.
Towsley, John T., Mfg. Co.

Motors.
——See Electric Motors.

Napping Machinery.
American Napping Machine Co.
Borchers, Richard C., & Co.
Columbia Napping Machine Co.
Curtis & Marble Machine Co.
Gessner, David.
Jones, Lewis.
Leigh, Evan A.
Parks & Woolsen Machinery Co.
Whiteley, William, & Sons, Ltd.
Woonsocket Napping Machinery Co.

Noils (Silk)
Malcolm Mills Co.
Ryle, Wm., & Co.

Numbering Machines.
Del Solar, J. A.
Force, Wm. A., & Co.

Oil Cups.
Lunkenheimer Co.
Pittsburgh Gage & Supply Co.
Walworth Manufacturing Co.

Oil Filters.
Burt Manufacturing Co.
Pittsburgh Gage & Supply Co.

Oils.
Borne, Scrymser Co.
Murphy, E. W., & Co.
New York & New Jersey Lubricant Co.
Stephenson Mfg. Co.

Oilless Bearings.
Arguto Oilless Bearing Co.

Oil Hole Covers.
Tucker, W. W. & C. F.

Overhead Tracks.
Cohoes Foundry & Machine Co.
Putnam & Co.

Overseaming Machines.
Merrow Machine Co.
Willcox & Gibbs Sewing Machine Co.

Oxidising Machinery.
Dubois, A. N.

Paint.
Del Solar, J. A.
Standard Paint Co.

Painting and Whitewashing Machines.
Del Solar, J. A.

Pantagraphs for Mill Engraving.
Johnson, C. A., & Co.

Paper.
Richardson Bros.

Paper Tubes.
Pairpoint Mfg. Co.

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Paper Box Machinery.
Beck, Chas., Paper Co., Ltd.

Patent Solicitors.
Crosby & Gregory.
Howson & Howson.
Siggers & Siggers.
Straley, Hasbrouck & Schloeder.

Perforated Metals.
Allis-Chalmers Co.
Beckley, A. J., & Co.

Peroxide of Sodium.
Roessler & Hasslacher Chemical Co.

Pipes and Fittings.
Pancoast, Henry B., & Co.
Walworth Manufacturing Co.

Pneumatic Conveying.
——See Ventilating.

Power Transmission Machinery.
Allis-Chalmers Co.
American Drying Machinery Co.
American Mfg. Co.
American Pulley Co.
Cohoes Foundry & Machine Co.
Evans, G. Frank.
Horsburgh & Scott.
Howard Foundry & Machine Works.
Hunter, Jas., Machine Co.
Jeffrey Manufacturing Co.
Kilburn, Lincoln & Co.
Houghton, E. F., Co.
Pittsburgh Gage & Supply Co.
Philadelphia Drying Machinery Co.
Reeves Pulley Co.
Saginaw Manufacturing Co.
Schofield, Wm., Co.
Sellers, William, & Co.
Smith, Jas., Woolen Machinery Co.
Standard Pressed Steel Co.
Textile Finishing Machinery Co.

Preparatory Machinery (Cotton).
Atherton, A. T., Mach. Co.
Howard & Bullough Am. Machine Co.
Kitson Machine Co.
Leigh, Evan A.
Riley, C. E., & Co.
Saco & Pettee Machine Shops.
Smith, Jas., Woolen Machinery Co.

Presses.
Boomer & Boschert Press Co.
Butterworth, H. W., & Sons Co.
Curtis & Marble Machine Co.
Gessner, David.
Hart, Charles.
Howard Foundry & Mch. Wks.
Miller Press & Machine Co.
North Chelmsford Machine Co.
Spence & Rideout.
Textile Finishing Machinery Co.
Woonsocket Machine & Press Co.

Pressure Regulators.
Crosby Steam Gage & Valve Co.
Mason Regulator Co.
Walworth Mfg. Co.

Pulleys.
——See Power Transmitting Machinery.

Pumps.
Allis-Chalmers Co.
Goulds Mfg. Co.
Textile Finishing Machinery Co.

Pump Governors.
Crosby Steam Gage & Valve Co.
Mason Regulator Co.
Walworth Mfg. Co.

Purifying & Filtration Plants.
Norwood Engineering Co.
Philadelphia Water Purification Co.
Scaife, W. B., & Sons.

Quillers.
Foster Machine Co.
North Chelmsford Machine Co.
Payne, G. W., & Co.

Rag Pickers.
Philadelphia Textile Machinery Co.
Schofield, Wm., Co.
Smith, Jas., Woolen Machinery Co.

Ramie Tops and Noils.
Tierney, Frank A.

Raw Hide Gears.
Horsburgh & Scott.
New Process Raw Hide Co.

Reed and Harness Manufacturers.
American Supply Co.
Walder, J.

Reels.
North Chelmsford Machine Co.

Reducing Valves.
Crosby Steam Gage & Valve Co.
Mason Regulator Co.
Walworth Mfg. Co.

Regulators (Pressure).
Crosby Steam Gage & Valve Co.
Mason Regulator Co.
Walworth Mfg. Co.

Remnants.
Feingold, H. & D.

Ribbons.
Barton, F. C.
Cheney Bros.

Ring Travelers.
Shaw, Victor, Ring Traveler Co.

Roller Leather.
Houghton, E. F., Co.

Roofing.
Standard Paint Co.

Rope.
American Mfg. Co.

Rope Transmission.
American Mfg. Co.

Rope and Twine Machinery.
Haskell-Dawes Machine Co., The.

Roving Cans.
American Vulcanized Fibre Co.
Hill, James, Mfg. Co.
Laminar Fibre Co.

Ruberoid Roofing.
Standard Paint Co.

Saddles and Stirrups.
Dixon Lubricating Saddle Co.

Scales.
Sweet & Doyle.

Scallop Machines.
Merrow Machine Co.

Schools.
Lowell Textile School.
New Bedford Textile School.
Philadelphia Textile School.

Secondhand Machinery.
——See Mchry. Dealers also classified ads.

Screens (Perforated).
——See under Perforated Metal.
——**See Commission Merchants.**
——See Commission Merchants.

Separators.
Draper Co., The.

Sewing Machines and Supplies.
Ahlstrom, O. J.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Wks.)
Curtis & Marble Machine Co.
Dinsmore Mfg. Co.
Fales, L. F.
Manufacturers' Supplies Co.
Somerville Machine Wks., Birch Bros. Co.
Textile Finishing Machinery Co.
Willcox & Gibbs Sewing Machine Co.

Shafting, Hangers, Etc.
——See Power Transmission Machinery.

Shearing Machinery.
——See Dyeing, Drying, Bleaching and Finishing.

Sheet Metal Work.
Barney Ventilating Fan Works.
Hartford Blower Co.
Lupton's, David, Sons Co.

Shell Rolls.
Thurston, A. G., & Son.

Shoddies.
——See Wool Shoddies.

Shuttles.
——See Bobbins, Spools, Shuttles, Etc.

Silk Machinery.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Wks.)
Butterworth, H. W., Sons Co.
Leigh, Evan A.
Mason Machine Works.
Stoddard, Haserick, Richards & Co.
Textile Finishing Machinery Co.

Silk Mill Supplies.
Hall, I. A., & Co.

Silk Noils.
Fawcett, Hughes.

Singe Plates.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Wks.)
Butterworth, H. W., Sons Co.
Taunton, New Bedford Copper Co.
Textile Finishing Machinery Co.

Singeing Machines.
Arlington Mch. Wks. (Arthur Birch, prop.)
Butterworth, H. W., Sons Co.
Curtis & Marble Machine Co.
Firth, William, Company.
Knapp, Charles H.
Leigh, Evan A.
Somerville Machine Wks., Birch Bros. Co.
Smith, Drum & Co.
Stubbs, Joseph.
Textile Finishing Machinery Co.

Sizing, Starch and Gums.
Arabol Mfg. Co.
Del Solar, J. A.
O. K. Soap Co.
Stein, Hirsch & Co.

Skylights.
Drouve, G., Co.
Lord & Burnham Co.
Lupton's, David, Sons Co.

Slashers.
Cohoes Foundry & Machine Co.
Leigh, Evan A.
Lowell Machine Shop.
Riley, C. E., & Co.

Soaps.
India Alkali Works.
O. K. Soap Co.
Rome Soap Mfg. Co.
Tully, J. J.

Spindles.
Bamford & Smith.
Buckley, Benjamin, Sons, Gun Mill.
Draper Company.
Easton-Burnham Co.
Leigh, Evan A.
Riley, C. E., & Co.
Stoddard, Haserick, Richards & Co.
Ward & Vandegrift.
Whitin Machine Works.

Spindle Tubes.
Bamford & Smith.
Riley, C. E., & Co.
Stoddard, Haserick, Richards & Co.

Spinning Frames.
——See Cotton Machinery.

Spinning Rings.
Draper Company.
Whitinsville Spinning Ring Co.

Spinning Tubes.
Buckley, Benjamin, Sons.

Spools.
——See Bobbins, Spools, Shuttles, Etc.

Spoolers.
Draper Company.
Easton & Burnham Machine Co.
Lindsay, Hyde & Co.
Payne, George W., & Co.

Stamps for Hosiery.
Wells, Wilfred.

Steam Boilers.
Wickes Bros.

Steam Boiler Insurance.
Hartford Steam Boiler Inspection & Insurance Co.

Steam Engines.
Allis-Chalmers Co.
American Blower Co.
Arlington Mch. Wks. (Arthur Birch, prop.)
Atlas Engine Works.
Birch Bros. Co. (Somerville Mchn. Wks.)
Buffalo Forge Co.
Fishkill Landing Machine Co.
Harrisburg Foundry & Machine Co.
Hooven (The), Owens & Rentschler Co.
Sturtevant, B. F., & Co.
Textile Finishing Machinery Co.

Steam Jacket Kettles.
Badger, E. B., & Sons Co.

Steam Pumps.
Goulds Manufacturing Co., The.

Alphabetical Advertising Index, with page numbers, follows this list.

BEST FOR MILLS

STANDARD FOR 13 YEARS
IN MILL, FACTORY, FOUNDRY
AND ALL CONSTRUCTION.

The genuine has the name
"RUBEROID"
plainly stamped on the under side every four feet.

Manufactured solely by
THE STANDARD PAINT CO.
100 William St., " NEW YORK.

alkali-proof. Not injured by great heat, vibration, gases or smoke. Outlasts metal and costs less.

Finely suited to roofs subject to severe usage. Water-proof, acid and

RUBEROID ROOFING

(Trade Mark Registered)

Steam Specialties.
Butterworth, H. W., Sons Co.
Crosby Steam Gage and Valve Co.
Houghton, E. F., Co.
Lunkenheimer Co.
Mason Regulator Co.
Parson Mfg. Co.
Pittsburgh Gage & Supply Co.
Power Specialty Co.
Sturtevant, B. F., Co.
Textile Finishing Machinery Co.
Walworth Manufacturing Co.

Steam Traps.
Albany Steam Trap Co.
Lunkenheimer Co.

Stop Motion for Looms.
——See Warp Stop Motions.

Tanks, Tubs and Vats.
Caldwell, W. E., Co.
Cypress Lumber Co.
Hall, Amos H., Son & Co.
Lewis, H. F., & Co.
North Chelmsford Machine Co.
Stevens, D. B., & Co.
Textile Finishing Machinery Co.

Tapes, Braids and Edgings.
Barton, F. C.
Cathcart, John, & Co.
Chapin, George W.
Friedberger Mfg. Co.
Hoffman, DeWitt & McDonough.
Krout & Fite Mfg. Co.
Weimar Bros.

Telephones.
Pettes & Randall Co.

Temples.
Draper Co.

Tentering Machines.
——See Dyeing, Bleaching Machinery, Etc.

Tenter Clips.
——See Dyeing, Drying, Bleaching and Finishing Machinery.

Testing Machines.
Howard Foundry & Machine Works.

Textile Schools.
——See Schools.

Thread Board for Spinning & Twisting Frames.
Houghton, L. T.

Ticketing Machinery.
——See Labeling Machines.

Trucking.
McKeon, John F.

Trucks (See Mill Trucks).
Towsley, John T., Mfg. Co.

Turbines.
——See Water Wheels.

Twine.
American Mfg. Co.
Richardson Bros.

Twine Machinery.
Haskell-Dawes Machine Co.

Twisting Machinery.
Philadelphia Textile Machinery Co.
Whittle, Jas. H.

Valves.
Boston Belting Co.
Crosby Steam Gage & Valve Co.
Lunkenheimer Co.
Mason Regulator Co.
Walworth Mfg. Co.

Ventilating Apparatus.
Allington & Curtis Mfg. Co.
American Air Moistening Co.
American Blower Co.
American Drying Machinery Co.
Barney Ventilating Fan Works.
Berry, A. Hun.
Boston Blower Co.
Buffalo Forge Co.
Drouve, G., Co.
Hartford Blower Co.
Lord & Burnham Co.
Massachusetts Fan Co.
Nichols, E. M.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Sargent's, C. G., Sons.
Schnitzler, Chas. H.
Smith, Jas., Woolen Machinery Co.
Sturtevant, B. F., Co.
Wing, L. J., Mfg. Co.

Warpers.
Draper Company.

Warping and Beaming Machinery.
Draper Co.
Entwistle, T. C., Co.
Philadelphia Textile Machinery Co.
Whiteley, William, & Sons, Ltd.

Warp Stop Motions.
Draper Co.

Washers (Cloth).
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch, Arthur, Arlington Machine Wks.
Birch Bros. Co.
Butterworth, H. W., & Sons Co.
Hunt, Rodney, Machine Co.
Hunter, Jas., Machine Co.
Kenyon, D. R., & Son.
Philadelphia Drying Machinery Co.
Somerville Machine Wks., Birch Bros. Co.
Textile Finishing Machinery Co.

Washing Soda.
Ford, J. B., Co.

Watchman's Clocks.
Imhauser, E., & Co.
Nanz & Co.
Pettes & Randall Co.
Riggs & Brothers.

Water Purifiers & Filters.
Philadelphia Water Purification Co.
Scaife, W. B., & Sons.

Water Softeners.
Philadelphia Water Purification Co.

Water Towers.
Caldwell, W. E., Co.
Stevens, D. B., & Co.

Water Wheels.
Hunt, Rodney, Machine Co.
Leffel, James, & Co.
Risdon-Alcott Turbine Co.
Smith, S. Morgan, Co.

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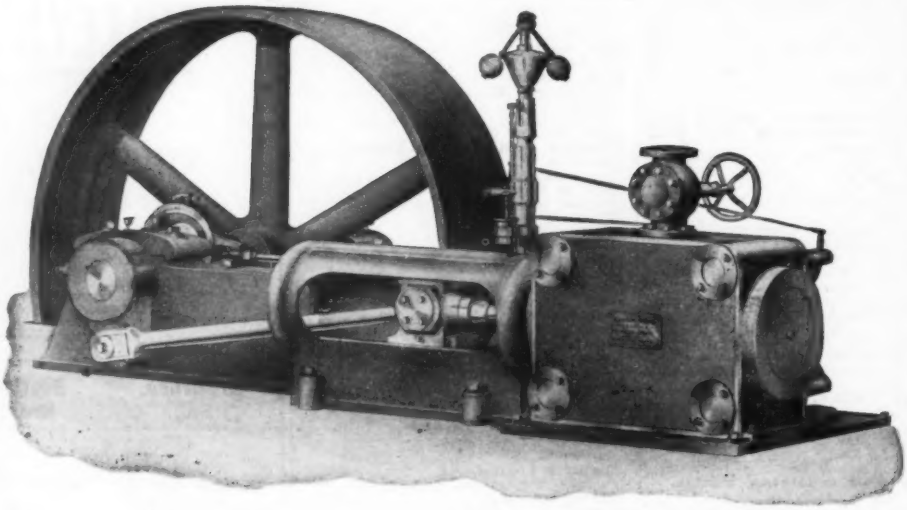

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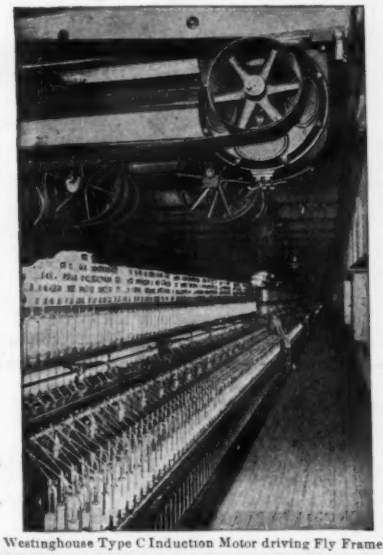

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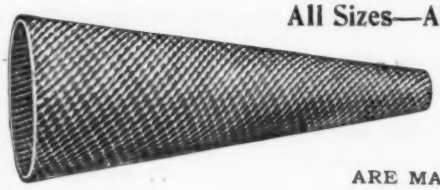

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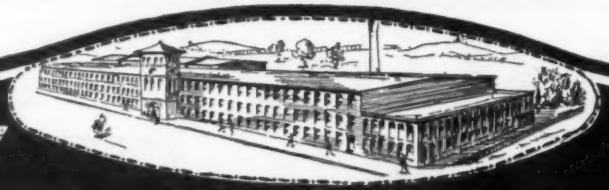

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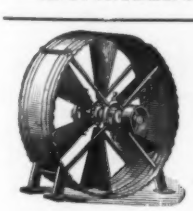

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Superintendent of Cotton Yarn Mill or duck mill. A young man; American; married. Prefers position in the South. Worked in different departments, spinning, spooling, twisting, warping, reeling and balling and now ready for a superintendent's place. Unquestionable references. 3087, Textile World Record.

Superintendent or Manager of large hosiery yarn mill will be open to a position shortly. American; married. Has manufactured in the South hosiery yarns in natural stats, mixtures, silver grays, bleached and colored. Can refer to influential men. 1961, Textile World Record.

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Superintendent. Worked on cassimeres, unions, satinets, overcoatings, horse goods, bed blankets, linings, etc. Understands stock mixing, picking and figuring. Has had full charge of mill. 3074, Textile World Record.

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Superintendent, age 34; American; married. Worked on fancy woolens. Not employed, and can take position at once. Will not go to Canada or West or South. Would take a good boss spinner place or assistant superintendent, but wants over $4.00 per day. 3104, Textile World Record.

Superintendent or designer of small or medium sized mill. All kinds of fancy worsteds, cassimeres, cheviots, overcoatings and dress goods. Age 31; married; Scotch. 3076, Textile World Record.

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Manager or Superintendent of a woolen mill, who understands designing, is open to an engagement. 34 years old; Scotch, and single. Large experience in Scotch and Canadian mills on tweeds, worsteds, overcoatings, etc. Good references. 1890, Textile World Record.

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Same rates as Wants, For Sale, etc. Manufacturers will be furnished, without charge, with the names of suitable men who are entered on our list, and can usually supply their wants in this way.

Man Wanted to take charge of winding room where there are Universal and other winders, also reeling and skein work. Married man. Steady work. Apply, B. C. A., Textile World Record, Boston.

Secondhand Wanted for ring spinning. Married man preferred. Steady work. Address Knitting Co., Textile World Record, Boston.
Ra, Textile World Record, Boston.

Wanted. A partner with capital to invest in an established concern, manufacturing pants and overalls in the South. Desire to add a knitting department to present business. To the man with proper experience the entire management will be given, as the present owner has other business that claims his attention. Address "Prat," Textile World Record, Boston, Mass.

Partner Wanted. Practical man thoroughly experienced in knitting men's high grade union suits, to join advertiser in starting small plant. One with some capital preferred, but not absolutely necessary. Address, Knitting, Textile World Record, Boston.

A Position is Open. Do you know where it is? We do. We have openings for high-grade men of all kinds—Executive, Technical, Clerical—paying from $1,000 to $10,000 a year. High grade exclusively. Write for plan and booklet. Hapgoods (Inc.), Suite 511, 309 Broadway, New York.

Help Wanted. Draftsman, designer of cotton and spinning machinery in general by a large manufacturing company in the central west. Good opening and a permanent place for a thoroughly competent man. State age, experience and salary expected. Address Draftsman, Textile World Record, Boston.

WANTED.

Treasurer and agent for flax, hemp and jute mill. Already about $90,000 has been subscribed, and a competent man is wanted to put in about $15,000 more and take the management of the finances and act as agent. Practical end of the business is in competent hands. Address, J. L. C., Textile World Record, Boston, Mass.

SITUATIONS WANTED.

COTTON SUPERINTENDENTS.

Wanted, position as superintendent of cotton cloth or yarn mill. American, 42 years old. 27 years' mill experience. Past six years as superintendent. Goods from 3 1/2 to 14 yards per pound. Recommendations from Massachusetts and Vermont mills. 214, Textile World Record.

Superintendent Cotton Mill open to a position. Age 33; American; married. Good experience as overseer of carding in large mills. Combed and carded hosiery yarns, shirtings, sheetings, chevfots, madras. First-class references. 2096, Textile World Record.

Superintendent. Worked on ginghams and cotton warps of all kinds. Lowell, Whitin and Draper machinery. Age 41; American. Good experience. 2095, Textile World Record.

Supt. of Cotton Mill, or overseer of mule or ring spinning is open to a position; 16 years' experience in Northern mills, on yarns, denims, awnings, apron checks, bicycle suitings, shirtings, etc., etc. Familiar with all well-known makes of cotton machinery; 29 years old; American; married. Can give references from large Massachusetts mills. 1527, Textile World Record.

Superintendent. Would like position in South. Not particular about salary to start. Machinist and thoroughly acquainted with all kinds of card room machinery, also spinning frames. Taken superintendent course in textile school and has had 23 years of practical experience in the mill, mostly on fine yarn work. 3044, Textile World Record.

Cotton Mill Superintendent. Age 38; Scotch; married. All counts of American and Egyptian cotton from 10 to 60, twist and weft, warps, beams, and bundles and crape yarns, super quality. Familiar with Platt, Asa Lee, Howard & Bullough, Hetherington and Brooks & Doxey machinery. First-class references. 3042, Textile World Record.

Superintendent, or overseer of carding. Worked on combed and carded yarn from 20 up to 140, twilled sateens, lawns, sheetings and shirtings. English and American machinery. 3036, Textile World Record.

Cotton Mill Superintendent, or assistant. Age 34; married. Worked on cotton machinery on coarse and medium numbers. Textile school education in designing, carding and spinning. 3003, Textile World Record.

Assistant Superintendent or boss weaver of cotton mill. Twenty-five years' experience. Unquestionable references as to character and ability. Thoroughly acquainted with plain, fancy box or lappet looms. Can take place on short notice. 3034, Textile World Record.

Superintendent of Cotton Yarn Mill or duck mill. A young man; American; married. Prefers position in the South. Worked in different departments, spinning, spooling, twisting, warping, reeling and balling and now ready for a superintendent's place. Unquestionable references. 3087, Textile World Record.

Superintendent or Manager of large hosiery yarn mill will be open to a position shortly. American; married. Has manufactured in the South hosiery yarns in natural state, mixtures, silver grays, bleached and colored. Can refer to influential men. 1961, Textile World Record.

WOOLEN SUPERINTENDENTS.

Superintendent of large experience in the manufacture of woolen and worsted fancies and suitings, is open to an engagement as superintendent or designer. Age 45; American; married. Good references. 1982, Textile World Record.

Superintendent of small woolen mill. Piece dyed goods, thibets, Venetians, meltons, etc. 3114, Textile World Record.

Superintendent. Worked on cassimeres, unions, satinets, overcoatings, horse goods, bed blankets, linings, etc. Understands stock mixing, picking and figuring. Has had full charge of mill. 3074, Textile World Record.

Superintendent. Has made yarn and shoddies and about everything in woolen line. Good general knowledge of woolen manufacture. Familiar with English, Belgium and American carding, spinning and preparatory machinery. 3088, Textile World Record.

Superintendent or Overseer. 20 years' experience as overseer in both England and Scotland over combing, drawing, spinning, etc. Can work both long and short wools, get up all kinds of mixtures, instruct the shading of batches, etc. Has good references. 43 years of age. 3086, Textile World Record.

Superintendent. American; married. Worked on cassimeres, dress goods, cotton warps, and has had some experience on worsteds. Will go anywhere, but would like a good Western mill. Good experience. 3034. Textile World Record.

Superintendent woolen mill. Age 47; English; married. Wants New England or Middle States. 10 years' experience in first-class N. E. mills. 2028, Textile World Record.

Superintendent, manager or designer. Age 37; English; married. Worsted and woolen goods for men's wear and rain cloths. Worked in English mills, and has also been employed in this country. 3103, Textile World Record.

Superintendent, age 34; American; married. Worked on fancy woolens. Not employed, and can take position at once. Will not go to Canada or West or South. Would take a good boss spinner place or assistant superintendent, but wants over $4.00 per day. 3104, Textile World Record.

Superintendent or designer of small or medium sized mill. All kinds of fancy worsteds, cassimeres, cheviots, overcoatings and dress goods. Age 31; married; Scotch. 3076, Textile World Record.

Asst. Superintendent or Overseer. 20 years' experience as overseer in both England and Scotland over combing, drawing, spinning, etc. Can work both long and short wools, get up all kinds of mixtures, instruct the shading of batches, etc. Has good references. 43 years of age. 3086, Textile World Record.

Superintendent wants position. Worked on cassimeres, cloakings, unions, etc. American; married. 15 years' experience. References. 1674, Textile World Record.

Manager or Superintendent of a woolen mill, who understands designing, is open to an engagement. 34 years old; Scotch, and single. Large experience in Scotch and Canadian mills on tweeds, worsteds, overcoatings, etc. Good references. 1890, Textile World Record.

COTTON CARDERS.

Carder in Cotton Mill. Coarse or fine, white or colored, hosiery, Egyptian, etc. Age 35; Canadian; married. 3029, Textile World Record.

Overseer of Carding. Large experience on all kinds of work and both English and American systems. Can furnish first-class references. Had charge of carding in some of the best New England mills. 3009, Textile World Record.

Overseer of Carding or cotton ring spinning. Worked on carded and combed Peelers, Egyptian, and Sea Island cottons, making yarns from 8 to 80. 3015, Textile World Record.

Overseer of Card Room. Had good experience in carding, and is an expert in the manufacture of combed yarns from the bale to the finished article. Good references. Wants no less than $18 per week, and will no go South or to Canada. 1745, Textile World Record.

Overseer of Carding. Has held all positions in picker and card rooms. White and colored goods, 6s to 40s. 3070, Textile World Record.

Overseer of Carding Mill. All kinds of fine yarns. Started up two of the largest card rooms in New England. Considered an expert in the manufacture of combed yarns from the bale to the finished article. First-class recommendations. 1745, Textile World Rcord.

Overseer of Cotton Carding. Worked on all classes of cotton, carded and combed, in counts to 135s. Will not go West or South. 3061, Textile World Record.

Overseer of Carding or Ring Spinning. Age 35; American. Sheetings, prin e and yarns, coarse and fine. Worked on most American machinery, but is more familiar with Lowell & Whitin. 1915, Textile World Record.

Overseer of Cotton Carding. Worked on all classes of cotton, carded and combed, in counts to 135s. 3061, Textile World Record.

Overseer of Carding. Age 32; American. Sheetings and prints. Wants New England only. Familiar with Lowell and Biddeford machinery. 3117, Textile World Record.

WOOLEN CARDERS.

Overseer for Washing, Carding or Combing wool for worsted wants to better himself. Speaks German, French and English. Best of references. 2033, Textile World Record.

Carder, or carder and spinner. German; married. Worked on all wool, wool and cotton, and shoddy mixes. Ten years' actual experience, and can furnish first-class recommendations. 2057, Textile World Record.

Overseer of Woolen Carding. Worked on all wool, wool and shoddy, wool, shoddy and noils. Wants $4 a day. Familiar with Davis & Furber, Furbush, Lombard and Bollette and Brown Patent. 3071, Textile World Record.

Overseer of Combing, washing, carding. Age 36, English, married. All classes of wool. Good experience and first-class recommendation. 3094, Textile World Record.

Overseer of Woolen Carding. Would accept secondhand position. All wool, cotton and wool, shoddies, mixes, worsteds. Does not wish for position on shoddy, but would consider one. Blankets, suitings, flannels. Understands spinning. 3093, Textile World Record.

COTTON SPINNERS.

Second Hand on Mules. Has had 20 years' experience on cotton mule spinning as mule fixer and second hand. Age 39, with family. Good references. 1950, Textile World Record.

Overseer of Mule Spinning who has had a wide experience in large New England mills on yarns ranging from 24's to 160's is open to a position. 37 years old; American. Good references. 2003, Textile World Record.

Cotton Mule Spinner. Age 42; French; married. Has worked on prints and sheetings and on yarns from 2's to 50's. First class references. Two years' experience as secondhand and five as overseer. Wants $2.50 per day to start with. 1690, Textile World Record.

Overseer Ring Spinning, or asst. superintendent. Sea Island combed from 6s to 30s, American from 6s to 50s; in fact, all grades of cotton, also expert on cable yarn. Prefers South, but will go anywhere. Wants $3.50 per day to begin with. 2020, Textile World Record.

Overseer of ring spinning, spooling, warping and dressing. Will not go South. Middle aged; American; married. Good experience and references. 3059, Textile World Record.

Boss Ring or Mule Spinner. Age 43; English; married. Asa Lee mules, Lowell Machine Shop, Platt, Mason mules; Howard & Bullough, Lowell and Mason frames. Yarns from 5's to 90's. 3001, Textile World Record.

Overseer of Cotton Mule Spinning. Understands Mason and English makes of mules. Has worked in mule room sixteen years, five years as second hand and a year and a half as overseer. 28 years old; married; steady and temperate. Would like to get work in N. E. or New York states. Has worked on colored hosiery yarn and filling. 1822, Textile World Record.

Overseer of Ring Spinning. Aged 42; American; married. Ginghams, sheetings, awnings, denims, etc.; $3 to $4 per day. 3018, Textile World Record.

Overseer Ring Spinning, Warping and Spooling. Is experienced on white work from Nos. 4's to 30's. Is familiar with Whitin and Lowell Machine Shop spinning frames and spoolers and warpers. Wants $3 per day to start with. Age 39; American; married. 1703. Textile World Record.

WOOLEN SPINNERS.

Overseer of woolen spinning desires to make a change. Is familiar with suiting, union, cassimere, satinet and knitting yarns and all ordinary makes of machinery. 30 years of age; American; married. Good references as to character and ability. 1987, Textile World Record.

Overseer Ring Spinning, or asst. superintendent. Sea Island combed from 6s to 30s, American from 6s to 50s; in fact, all grades of cotton, also expert on cable yarn. Wants $3.50 per day to begin with. 2020, Textile World Record.

Worsted Spinner or Section Hand. Age 22 and unmarried. At present employed, but not satisfied with surroundings. Would accept moderate pay. 1709, Textile World Record.

Boss Spinner. Age 34; Scotch. Worked on all wool, cotton and wool and shoddy mixes. Will not go West, South or to Canada. References. Good experience. 3032, Textile World Record.

Overseer of Ring or Frame Spinning, or would take superintendent position. Age 41; married. 2040, Textile World Record.

Worsted Drawer and Spinner. Would take twisting. Age 28; English; single. Can furnish references as to ability and character. 1784, Textile World Record.

COTTON WEAVERS.

Overseer of Weaving or designer. Lawns, sheetings, twills, sateens, quilts, bedford cords, lappets. A young man; unmarried. Good experience and first-class recomendation. 3063, Textile World Record.

Overseer of Weaving. Englishman; 33 years of age; married. Worked on fine lawns, sheetings, sateens and fancies, coarse drills, twills, bicycle cloth, automobile cloth for tires. Familiar with Whitin, Crompton, Knowles, Mason, Kilburn & Lincoln and Lowell machines. 3073, Textile World Record.

Overseer of Weaving. Accustomed to fancies. Can do own designing and figuring. Good references from past employers. Is open to go anywhere. Had experience on many kinds of looms, including the Draper. 1731, Textile World Record.

Overseer of Weaving. Sheetings, sateens, ginghams, and dimities. Will not go South. 3116, Textile World Record.

Overseer of Weaving wants position. Practical experience from weaver, loom fixer, secondhand to overseer, on all kinds of looms and make of goods. References. Good manager of help. Married man; 35 years of age. 1806, Textile world Record

Overseer of Weaving. Age 35; Scotch; married. Good experience, and excellent references, Crompton, Whitin, Lowell, Colvin, Woonsocket and English looms. Sheetings, lawns, ginghams, flannels, fine worsteds, dress goods, shirtings and novelty goods. 2016, Textile World Record.

WOOLEN WEAVERS.

Overseer of Weaving, also designer. Men's wear, woolen and worsted, and fancies of all kinds, cotton worsteds, dress goods. Knowles and Crompton looms. Age 35. 3056, Textile World Record.

Overseer of Weaving, or would take good second hand job. Age 42; married. Worked on dress goods, suitings, plaid backs, cloakings, meltons and other classes of goods. Worked on Crompton & Knowles loom. 3016, Textile World Record.

Boss Weaver or assistant superintendent. Worked on all kinds of worsteds and woolens. Crompton & Knowles looms. Wants place at once. Middle aged; English; married. Good experience. Excellent references. 3062, Textile World Record.

Boss Weaver. Aged 38; married. Cassimeres, beavers, kerseys, dress goods, flannels, blankets. Worked on Crompton & Knowles broad looms. Good recommendation. 3066, Textile World Record.

Overseer of Woolen Weaving, or would take a secondhand job. 35 years old; married. Familiar with Crompton & Knowles looms. Good references. 3089, Textile World Record.

Overseer of Weaving or designer. Age 29; American; married. Thibets, meltons, kerseys, worsteds and cotton worsteds. Crompton & Knowles looms. Good experience. First class recommendation. 2052, Textile World Record.

Superintendent of Weaving. Englishman; married. Worked on fancy worsted and cotton dress goods and men's wear. First-class recommendations. 3111, Textile World Record.

Boss Weaver wants position. Very wide experience. White and colored, plain and fancy. Understands all kinds of looms. 335, Textile World Record.

DYERS.

Boss Dyer. Scotch; married. Wool, worsted, carpet and cotton yarn, piece goods, dress goods, raw stock. Will not go West, South or to Canada. Wants $3.50 or over. 3082, Textile World Record.

Dyer, bleacher and washer. Age 30; American; married. Cotton print goods in either the roll or garment, long and short hose, raw stock and yarn, aniline or oxidized black on hosiery. Good references. 3081, Textile World Record.

Dyer. Secondhand or overseer of small place. Single, steady man; 25 years old. Has had six years' experience on raw wool, cotton, yarn, shoddies and piece dyes. 3101, Textile World Record.

Dyer and Bleacher in black and colors. Age 36; married; Swiss. Cotton hosiery and yarn. 3051, Textile World Record.

Boss Dyer, mercerizer or bleacher. Scotch, married. Wool, yarns, piece, cotton and slubbing. Can take place at once. First-class recommendations. Familiar with all the latest improved machinery in the dyeing business. 3097, Textile World Record.

Dyer. Worked on piece dyes, wool, cotton, shoddy yarns, rags and union dyes and carbonizing. Wants place at once. Good experience and references. 3092, Textile World Record.

Dyer. Worked on all classes of goods, woolens, worsteds, yarn, piece dyes, slubbing, blue vats and cotton mixes. An American; married. 3085, Textile World Record.

Boss Dyer. English; married; age 36. Eighteen years' experience on cotton and worsted skein, raw stock, woolen and worsted piece dyes, fancy men's wear, rain cloth, ladies' dress goods. Well up on all fancy shades. 1839, Textile World Record.

FINISHERS.

Finisher, both wet and dry. Age 28; English; married. Shirtings, ginghams, cotton dress goods, mercerized effects and men's cotton suitings and trouserings. Excellent references. 3007, Textile World Record.

Cotton Finisher. Age 27. Worked on prints, lawns, dimities, muslins, ducks, drills, Madras, etc. Understands folding and packing. 3005, Textile World Record.

Overseer of Finishing, worsted goods, white or fancy. A young man; married; English. Has had full charge of piece dye finishing. 3019, Textile World Record.

Boss Finisher. Worked on broad cloth, cheviots, kerseys, coverts, meltons, piece dyes, dress goods. Prefers Massachusetts, but will go anywhere in New England. Not employed and wants place at once. Young man; American. 3046, Textile World Record.

Boss Finisher in a woolen mill. Worked on kerseys, meltons, cassimeres, satinets, cheviots, etc. Wants $3.50 per day. Will not go to Canada or West. 3077, Textile World Record.

Overseer of Woolen and worsted finishing, wet and dry. Englishman; married. Worked on meltons, fancy cassimeres, men's and ladies' wear, flannels, blankets, etc. Understands carbonizing, speck dyeing, flocking and water proofing. 3113, Textile World Record.

Overseer of Cloth Room. Age 37; American; married. Wants $18 per week or over. 3110, Textile World Record.

Second Hand in cloth room desires position. At present has charge of samples in large mill. Has worked on all classes of cotton goods. Strictly temperate. 3048, Textile World Record.

KNITTERS.

Knitting Mill Manager with 20 years' experience in manufacturing all grades of wool and cotton knit underwear is open to an engagement. Married and of good character and habits. References given if required. Address "White," Textile World Record, Boston.

Knitter. Worked on light and heavy weight ladies' ribbed vests and shaped vests, and all kinds of common knit goods. Familiar with Champion, Nye & Tredick, Star, McMichael & Wildman machines. Wants work in Pennsylvania. 3037, Textile World Record.

Superintendent or Machinist. Age 36; English; married. Worked on underwear, ribbed and plain; sweaters, circular and flat; hosiery, circular and full fashioned. Will not go West or South. First-class recommendation. 3095, Textile World Record.

Knitter. Worked on light and heavy weight ladies' ribbed vests and shaped vests, and all kinds of common knit goods. Familiar with Champion, Nye & Tredick, Star, McMichael & Wildman machines. Wants work in Pennsylvania or Western States. 3037, Textile World Record.

Boss Knitter. finisher or machinist. **Worked on nearly all kinds of knit goods, and nearly all kinds of latch needle knitting machines and all kinds of machines used in finishing underwear. 889, Textile World Record.**

Overseer Boarding and finishing hosiery. All kinds of men's, women's and children's hosiery, except silk. Age 41; American; married. Can furnish references. 3035, Textile World Record.

Superintendent of knitting mill, or foreman in large plant, is open to position. Had some 15 years' experience as machinist, foreman and superintendent. Familiar with all grades seamless hosiery and most makes of seamless hosiery machinery. Understands business from starting new mills to finish. Perfectly sober and reliable. 3078, Textile World Record.

Position wanted in charge of boarding, pressing, pairing, folding of hosiery, etc. First-class references. 3105, Textile World Record.

Asst. Superintendent or Boss Knitter. Age 29 strictly temperate and held position of boss knitter for past four years running. Fleeces, balbriggan and flat work on spring needles, and plaited, straight and shaped work on several makes of latch needles. Can give best of references. 1492, Textile World Record.

General Manager or superintendent of ribbed underwear mill. American; married. Been in underwear business eleven years as superintendent and manager. First-class references as to character and ability. 3100, Textile World Record.

Boss knitter, sewing machine fixer. Age 28; American. All classes of ladies' and children's knit underwear made on circular latch needle machines. Wants place at once. 3102, Textile World Record.

Latch Needle Knitter on N. & T., S. & H., S. & W., McM. & W., Pepper, Lewis Jones, etc., circular machines. Twelve years' experience as boss knitter and superintendent. Wants steady work. Sober, good manager of help, best of references. 3106, Textile World Record.

Boss Knitter or fixer. Would like to work with boss finisher on sewing machines. American; age 32. Familiar with McMichael & Wildman, Nye & Tredick, Snyder & Fisher, Scott & Williams and other makes of latch needle machines, Tompkins spring needle machines, and understands winding. 3118, Textile World Record.

Superintendent or Foreman of seamless hosiery familiar with cotton and woolen goods on Scott & Williams, Electric, Acme, Standard and several other makes, ribbers, loopers, sewing machines, etc., is open to a position. 40 years old; American; married. Best of references. 1657, Textile World Record.

Superintendent knitting mill. Cotton and wool hosiery, heavy mittens, sweaters, toques. Good experience. Aged 45; married. 1291, Textile World Record.

Superintendent Hosiery Mill. Age 22; American; single. Worked on 84 needle goods. Prefers position in the South. 3033, Textile World Record.

DESIGNERS.

Designer or Asst. Age 28; unmarried. Men's wear, woolens and worsteds. Prefers New England States. Thoroughly posted technically in all points, good on colors, calculations, etc. 3099, Textile World Record.

Designer. A young man who has had eight years of practical experience in cotton designing wants position as designer or boss weaver. Worked on Marseilles, crochet and satin bed spreads, table covers, ginghams of all kinds, including leno, lappet and all classes of the above. Jacquard work a specialty. 3107, Textile World Record.

Designer. Plain satin, fancy leno, checks, colored and dainties in cotton. Wants $3.50 or over a day. 3043, Textile World Record.

Designer, or assistant superintendent and designer. An A1 color designer. Can get up good line of fancy woolen and worsted goods which will be good sellers **and profitable to the manufacturer.** Graduate of a prominent designing and textile school in Germany. Is well posted on all kinds of stock, cotton and shoddy, and with the general work of a woolen mill. 1789, Textile World Record.

Asst. Superintendent or Designer. Familiar with men's wear, overcoatings and fancy worsteds. A young man. Taken post graduate course at Yorkshire College, Leeds, England. Attended Philadelphia Textile School a year and graduated from Lowell Textile School. Bright and of good character and habits. 3096, Textile World Record.

MISCELLANEOUS.

Wanted, by a hard working, industrious man (English) a situation as fixer, second hand or overseer in tape mill. 1826, Textile World Record.

Salesman for hosiery an underwear. **Age 37, single. Can furnish references. 3060, Textile World Record.**

Master Mechanic, or mechanical superintendent. **Many years' experience in general machine work and mill engineering. References. 3067, Textile World Record.**

Fixer of sewing machines. Is familiar with machinery of all kinds that is used in making up and finishing knit underwear. Will not go West or South. Wants place at once. References. 3068, Textile World Record.

Loom Fixer or boss weaver. American. Familiar with all kinds of looms. Can take place at once. A good, steady man, and thoroughly reliable. 3091, Textile World Record.

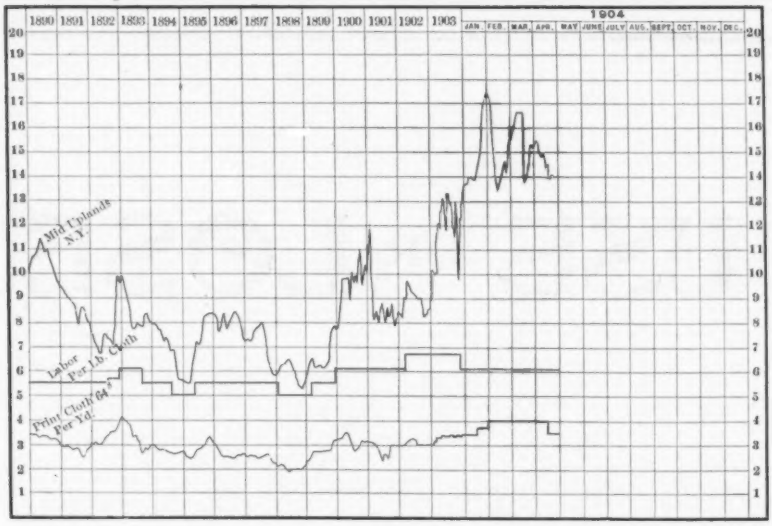
Machinist. French; married. Has had full charge of all kinds of repairing. Understands all about boilers, engines, motors and can give best of references. 3090, Textile World Record.

Traveling position with mill supply house. Has been dyer, but mill now closed. 3108, Textile World Record.

Overseer or second hand's position. Understands twisting, warping, spooling and cone winding. Worked on all kinds of cotton yarns. Will not go West or South. 3112, Textile World Record.

Overseer Fancy or plain dressing, spooling, warping, slashing, drawing-in, beaming, quilling, etc. Wants work in New England or will go to Canada. 3115, Textile World Record.

Machinist on Leighton circular machines. **Worked on sweaters and jacket. 2026, Textile World Record.**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1904
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CHART SHOWING RANGE IN THE PRICE OF COTTON TO DATE.

The Cotton Market.

Since the collapse of the speculative movement in cotton some weeks ago quotations have been declining, and at the present writing 13 7/8 cents for middling uplands seems low, although that price a few months ago would have appeared absurdly high. The high price of cotton has had a marked effect in reducing our exports of the staple. In March of this year the cotton exports amounted to only 156,760,459 lbs., valued at $23,337,201, or 14 9/10 cents per pound. For the same month last year the exports of cotton amounted to 374,133,496 lbs., valued at $36,584,370, or 9 7/10 cents per pound. In other words, the weight of cotton exported in March of this year was 58 per cent. less than for the same month last year, while the total value was 36 per cent. less.

A large part of the loss in weight will be balanced by the extensive reduction of consumption abroad. The mills of Lancashire and the Continent are running short time and facing the most serious condition since the Civil War. They have cut down their purchases of raw material to a minimum in order to combat what they believe to be abnormally high prices. Compared with the prices for goods cotton quotations are unquestionably too high. The goods market in every part of the world has failed to respond fully to the rise in cotton. Advances have been secured on goods, but far less than the manufacturer must obtain in order to make both ends meet.

The general curtailment will help to restore an equilibrium between the cotton and goods markets, but it will not add a fibre of cotton to the supply. Stocks at the mills both at home and abroad have been low for more than a year, and this condition will continue for a long time to come. A stern chase is a long one. This adage will prove true in the process of replenishing depleted mill stocks, a fact that will prevent any return of the former low prices for cotton, with which manufacturers were accustomed a few years age.

Not only mill stocks of cotton but the visible supply as well is unusually small. The Chronicle reports the world's visible supply on April 22, at 2,972,646 bales, as compared with 3,333,640 bales at same time in 1903; 3,719,869 bales in 1902; and 3,770,790 bales in 1901.

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Best in the World. Send for Catalogue.
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USE OR LOSE

Wyandotte Washing Soda while one of the soda compounds is yet entirely different from what are commonly known as washing sodas. It is an absolutely new product and owes its virtue and special properties to new facts. Because of these facts it will accomplish many acts wholly impossible with the ordinary soda compounds, or in fact, any other article on the American market.

It would be time profitably spent for every Woolen Mill, not now using Wyandotte Washing Soda to investigate its merits.

Wyandotte Washing Soda is packed in barrels 280-lbs. each and ½ bbl. waterproof airtight bags 140-lbs. each. Send for our free booklet "Directions for using Wyandotte Washing Soda in the Woolen Mill."

THE J. B. FORD CO. Sole Mfrs. Wyandotte, Mich.

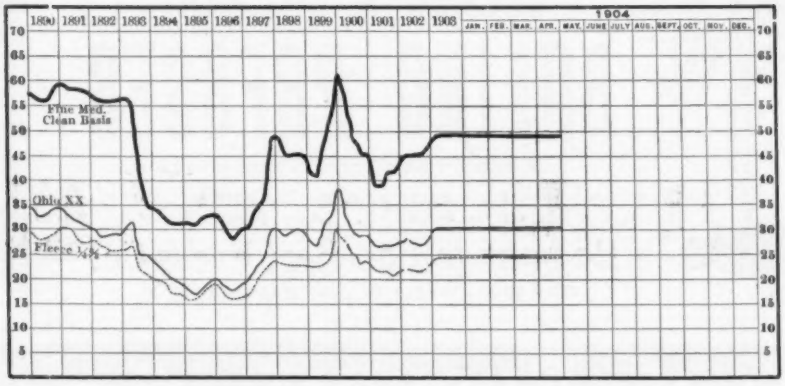


CHART SHOWING RANGES IN THE PRICE OF WOOL TO DATE.

The Wool Market.

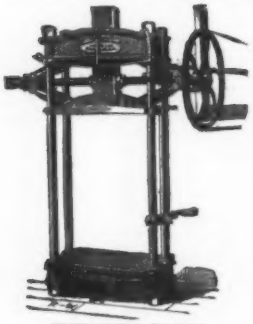
The dullness that has characterized the wool market for some time has continued during the past month and transactions have shrunk to very small proportions. This condition is the direct result of the depression in the goods market. The mills have fallen far short of placing orders to cover their production, many of them have shut down and nearly all the others are running slack. Under such conditions maufacturers have naturally confined their purchases to actual necessities and appeared on the wool market only when forced to replenish the stock of some special quality. It is generally believed that the stock of wool at the mills is small, the reason for this opinion being that manufacturers have purchased sparingly during the past year. Manufacturers show no signs of uneasiness over the small stock of wool and are quite willing that the wool dealer should carry the load during a presidential campaign when so pronounced a depression prevails in the market for goods.

A decline in the price of wool would naturally be expected under these conditions, but so far the market has not broken. There have been concessions made here and there to move wool, but as a general thing quotations have been maintained. This is doubtless due to the feeling that concessions in prices would not result in sales under present circumstances. Reports from the West indicate that while Eastern buyers are trading with much greater caution than last year, prices paid are above the level warranted by the business situation of the country.

Growers are very firm in their ideas regarding prices and are very unwilling to part with their wool at less than last year's figures. Unless they show a willingness to make concessions it is likely that a deadlock will occur between them and the buyers, resulting in a waiting market and possibly in a large part of the crop remaining in the growers' possession until next season.

Shrinkproof
SOMETHING NEW
Prevents Woolen Goods from Shrinking
Address
Charles H. Heyer
BUSTLETON, ... PENN.

STANDARD QUALITY COMBED RAMIE TOPS and NOILS a Specialty. RAMIE YARNS In All Numbers for All Purposes
SOLE AGENT,
FRANK A. TIERNEY,
WOOL, TOPS, NOILS, YARNS,
Fine, Medium and Coarse Wool Tops. Mohair Tops. Camel Hair Tops. Fine, Medium and Coarse Wool Noils. Mohair Noils. Camel Hair Noils. Silk Noils.
Special Fibres and Novelties for Woolen, Cotton and Silk Manufacturers.
Room 203, Wool Exchange Building, 260 W. Broadway, NEW YORK.



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Any Size .. Any Power

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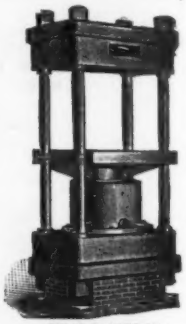

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EASTON AND BURNHAM MACHINE CO.,
Pawtucket, R.I.

ALL KINDS OF Spindles

USED IN THE MANUFACTURE OF COTTON, WOOL & SILK

IMPROVED UPRIGHT SPOOLERS

TO SPOOL FROM COP, SKEIN, OR BOBBIN.

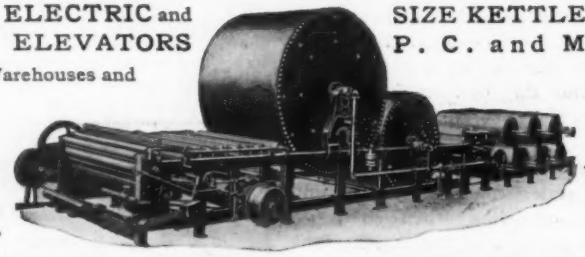
The COHOES SLASHER.

BELT-DRIVEN, ELECTRIC and HAND-POWER ELEVATORS

For Cotton Mills, Warehouses and Factories.

PULLEY BLOCKS.

OVERHEAD TRACKS.



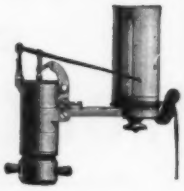
SIZE KETTLES. REPAIRS for P. C. and M. MULES and EMPIRE LOOMS.

WATERWHEEL GOVERNORS.

The COHOES IRON FOUNDRY & MACHINE CO, Cohoes, N. Y.

A Crosby Indicator

In the Hands of a Competent Man Will Increase the Effeciency of Your Plant and Cut Down Your Coal Bill. Faultless in Design. Perfect in Workmanship.



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Pop Safety Valves
Pressure and Vacuum Gages
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Rubber Pump Valves

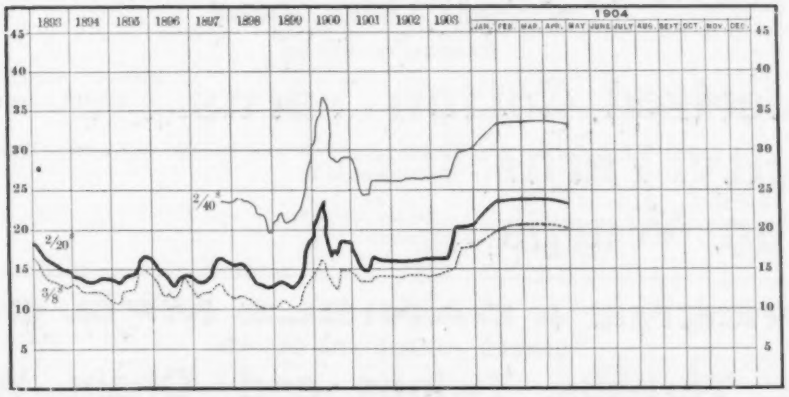
Recording Gages
Single Bell Chime Whistles
Feed Water Regulators
Lubricators—Oil Cups
Gage Glass, Water Gages, Etc.

CROSBY STEAM GAGE AND VALVE CO.

Stores:
BOSTON, NEW YORK, CHICAGO, LONDON

Office and Works:
BOSTON, MASS.

Yarn Department.



GRAPHIC CHART SHOWING RANGE OF PRICE OF COTTON YARN TO DATE.

Eastern Yarn Market.

Very little business is being done in cotton yarn. Knitters and weavers are unable to sell goods on the basis of the prices demanded for yarn, and spinners are unable to manufacture yarn at a profit at the present prices for cotton. The only remedy seems to be a curtailment of production of yarn. This policy is being followed by many of the mills. Lowering the price of yarn is out of the question while cotton costs 14 cents per pound. The continued refusal of buyers to pay high prices for manufactured goods has led to the general belief that the stock of goods in the jobbers' and retailers' possession is much larger than has generally been supposed. Both retailers and jobbers have been indifferent to the repeated and emphatic prediction of a scarcity of goods. The signs of a business reaction throughout the country have led to a policy of caution on the part of the merchants. While there may be a scarcity of cotton to supply the mills there certainly seems to be no corresponding scarcity of goods to supply the consumer.

The stocks of cotton yarn are probably somewhat larger than a few weeks ago, but the short time prevailing in many of the mills will doubtless counteract this tendency toward accumulation. It is useless to disguise the fact that the situation in the cotton trade generally is serious and the yarn trade has reached a point where ordinary business prudence demands a curtailment of production until a normal demand is restored. We quote as follows:

Eastern Cops.

6's	20½
8's	20¾
10's	21¼
14's	22¼
16's	22¾
18's	23¼
20's	23¾
22's	24¼
24's	24¾
26's	25¼
30's	26¼
34's	27
36's	28
40's	29

On cones, ¾c. more up to 14's; 1c. more from 15's to 22's; 1½c. from 23's to 35's, and 2c. above that.

Eastern Two-Ply Skeins, Carded Peeler.

12's	23
14's	24
18's	25
20's	26
22's	26½
26's	27
28's	27½
30's	28
36's	31
40's	33
45's	35
50's	38
55's	42
60's	47

Eastern Two-Ply Warps, Carded Peeler.

2/30's	29
2/36's	32½
2/40's	34
2/45's	35
2/50's	38
2/60's	47

Egyptian Weaving Yarns.
Single Skeins Combed.

30's	36
35's	38
40's	40

THE J. R. MONTGOMERY CO.,

Windsor Locks, Conn.

MANUFACTURERS OF

Mercerized Cotton Yarns Gives the High Silk-Like Lustre in Knit Goods and Woven Fabrics.

Novelty Yarns Boucle, Bourette and Spirals, in Cotton, Wool, Worsted, Mohair and Silk.

Cotton Warps on Beams, Jack Spools and Tubes. In Fancy, Twist, Colors and Printed.

GREENE & DANIELS MFG. CO.,

COMBED, CARDED AND GASSED

Yarns, Threads, Twines and Chain Warps,

Colored and Bleached Yarns Furnished in any manner desired by the trade.

Pawtucket, R. I.

M. J. TOOHEY & CO., OF FALL RIVER, MASS.

Banding made from Egyptian or White Cotton Yarn as Desired.

The Other Fellows Banding.

MONUMENT MILLS,

Manufacturers of

White, Colored, Fancy and Double Twist

COTTON WARPS

HOUSATONIC, MASS.

4s to 60s.

Dana Warp Mills

WESTBROOK, ... MAINE

White and Colored Warps 6s to 50s Single and Ply

Mule Cops From 30s to 50s from American & Egyptian Cotton

45's	42
50's	45
55's	49
60's	51
70's	58½

Two and Three Ply Skeins, Combed.

30's	39
36's	40
40's	42
45's	44
50's	47
55's	52
60's	54
70's	63

Philadelphia Yarn Market.

The trade on cotton yarns is very, very dull. None of the textile mills have any prospect of a busy summer, and a great many of them are on short time, at present. The demand for yarn has eased off and prices have declined. Some numbers are selling below cost of production on today's cotton market. Spinners with high priced cotton are facing an almost inevitable loss. There is a movement to curtail production of yarn and this has already been done by some of the large mills.

Stocks of yarn have increased the past month, but with general curtailment on the part of spinners, stocks would soon decrease to normal figures. We seem to have reached the time when the most of the consumers of yarn have run out of their low priced yarn and without having some low priced contracts to help average, they cannot run at a profit. Prices are demoralized, but they are about as follows:

Southern frame cones (good quality):—

7's and coarser	20
8's and 9's	20¼
10's	20½-20¾
12's	21
14's	21½
16's	22
18's	22½
20's	23
22's	23½
24's	24
26's	25
30's	26
40's	31
50's	37

Southern high grade mule yarn:—

Cones.

10's	22
12's	22½
14's	23
16's	23½
18's	24
20's and 22's	24½-25
24's	25½

Southern frame yarn, lower grades:—

6's and 8's	19-19½
10's	20

PAULSON, LINKROUM & CO.
Successors to BUCKINGHAM, PAULSON & CO.
Commission Merchants
COTTON YARNS of all Descriptions
83 Leonard St., NEW YORK
302 Chestnut St., Phila. 210 Munroe St., Chicago, Ill.
Cash Advances, Cash Sales and Prompt Returns. Consignments and correspondence solicited.

JAMES E. MITCHELL CO., COMMISSION MERCHANTS.
Cotton Yarns
FOR ALL PURPOSES.
122-124 Chestnut Street, PHILADELPHIA, PA.
Brown Building, 185 Summer Street, BOSTON, MASS.

CATLIN & CO.,
Yarns.
67 CHAUNCY STREET, BOSTON.
316 CHURCH STREET, NEW YORK.
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Ballou Yarn Co.
PROVIDENCE, R. I.
Harness and Seine Twines and other Job Gassing, Winding, etc. All Numbers.
GASSED YARN SPECIALTIES

A. D. SALKELD & BRO.,
With FRED'K VIETOR & ACHELIS,
YARNS.
66-72 LEONARD STREET, - NEW YORK.

Fred Sternberg & Co.
530 Broadway, - NEW YORK.
MERCERIZED, TURKEY RED, GASSED } COTTON YARNS.

E. D. LORIMER & CO.
COTTON YARNS } ALL NUMBERS
MERCERIZED YARNS } FOR ALL PURPOSES
346 BROADWAY, NEW YORK.

MOELLER & LITTAUER,
SILK, WORSTED, WOOLEN YARNS COTTON AND MOHAIR
Polished Threads and Tinsel. Artificial or Wood Silk. Mercerized, Turkey-Red, Fine Gassed Yarns.
109 GREENE ST., NEW YORK.

CAPACITY, 50,000 Spindles. **ORSWELL MILLS** FITCHBURG, MASS.

COMBED **COTTON YARNS** CARDED

In Chains and Skeins, on Balls, Beams, Spools—Single or Twisted.

THE MALCOLM MILLS CO.,

MANUFACTURERS OF

FANCY YARNS and POLISHED THREADS.

Offices: 229 Chestnut St., Philadelphia.

Mills: Frankford, Pa.

KROUT & FITE MANUFACTURING CO.,

Manufacturers of

Silk, Cotton and Mercerized Narrow Fabrics

Spool Tapes a Specialty.

Telephone Connection. Office and Mill, Allegheny Ave. and Emerald St., PHILADELPHIA.

EDDY & STREET,

Cotton, Woolen,

Yarns and Braids

Worsted, Spun Silk.

PROVIDENCE, R. I.

J. H. ENGLISH & CO.,

Commission Merchants.

COTTON YARNS

108-110 Franklin Street, New York, N. Y.

Consignments Solicited from Southern Mills. Liberal Advances made and Sales Cashed Promptly.

Indian Orchard Company.

Cotton Warps and Yarns. In Gray and all Colors, Single or Two or more Ply, and Cable Cord.

Novelty Yarns. in Various Patterns, Colors and Twists.

Carded and Colored Cotton. For Mixing with wool. Machined or in Roving.

Indian Orchard, Mass.

E. Morgan, Pres. H. K. Wright, Treas. W. C. Godfrey, Agt.

Eastern cones (high grade quality):—

10's	22½
12's	23
14's	23½
16's	24
18's	24½
20's and 22's	25-25½

Skein yarn (mostly Southern):—

4's to 8's soft	19
10's to 12's	20-20½
14's to 20's	21-21½
22's	22
14/2	21½
16/2	22
20/2	22½-23
30/2	25½
40/2	30
16/3 slack	21½
12/3 slack	21
8/3 carpet	20
8/3 slack	20
9/4 slack	20

Warps (mostly Southern):—

10's to 12's	20-20½
14's	21
16's	21½
20's to 22's	22-22½
26's	23
14/2	22
16/2	22½
20/2	23
24/2	24
30/2	25½
40/2	31

Mixed colored yarns (mock twist, half colors):—

6's to 10's	23½
12's to 14's	24½-25½
16's to 18's	25½-26½

Silver and jaeger, 1½c. over white.
Mock Egyptian, 2c. advance over white.
Egyptian, 4c. to 5c. above best quality white.

Worsted Yarn.

Spinners of English spun yarn are getting but few orders, and the prospects for a general shutdown are good. There is much idle worsted machinery. There is more idle worsted spinning machinery than is generally supposed. Business developed along lines which called for ¼ and ⅜ Blood yarn. This demand was created by the desire to get a good cloth cheap, but the great demand for this yarn has advanced the cost of 1/4 to 3/8 Blood wool to such an extent that a half Blood yarn can be sold as cheap as the lower qualities. The result of this is that the present is a transitory period from a 1/4 Blood yarn to a half Blood, as cloth buyers are buying the better grade at the same price as the cheaper grade of cloth.

The trend of the trade is towards worsted cloth and the better grades. Indications are that when the weavers get back to worsted it will be for a long time.

TRY OUR
Silkine, also Lisle Silk
FINISH
—FOR—
Hosiery, Knit Goods, Yarn, Fast Black, Harsh Colors, and Fibres.
O. K. SOAP CO., 968 Franklin St., PHILA.

RICHARD A. BLYTHE,
Commission Merchant,
COTTON YARNS OF EVERY DESCRIPTION.
114 Chestnut St., Philadelphia.

LINEN YARN IMPORTER.
HUGHES FAWCETT, 115 Franklin Street, NEW YORK.
Flax, Hemp and Jute Line and Tow Yarns,
For Weaving Purposes.
Linen Jacquard Harness Twines,
Fine Cotton Harness and Heddle Twines,
For Cotton, Silk, Woolen and Carpet Manufacturers.
Correspondence solicited. Samples promptly furnished.

Mercerized and Plain
Skein, Warps,
Cones, Cops,
Tubes
COTTON YARNS
426 and 428
Market St., Phila.
Theo. H. Strouse & Co.

Walcott & Campbell Spinning Co.
Fancy Hosiery Yarns
IN ALL COLORS
New York Mills, Oneida Co., New York

F. C. BARTON
MANUFACTURER OF LILY BRAND NARROW FABRICS
RIBBONS, TAPES, BINDINGS & NON ELASTIC WEBBINGS
54 FRANKLIN STREET, NEW YORK

ALLEGHENY WORSTED MILLS,

Thomas Wolstenho'me Sons & Co.,
MANFRS. OF
ALL NUMBERS
SINGLE AND TWO-PLY,
On Cop or in Skein, for Weaving and Knitting Purposes, in White, Natural and Fancy Mixes.

Worsted
YARNS
Sell Direct,
Office and Mills, Frankford Ave. and Westmoreland St., Phila, Pa.

POCASSET WORSTED COMPANY,

Worsted Yarns.

OFFICES:
6th Floor, Banigan Building,
PROVIDENCE, R. I.

CRANSTON WORSTED MILLS.

Worsted and Mohair Yarns—White or colors, in skeins, on spools, cones, or shuttle bobbins.

Novelty Yarns—of Mohair and Worsted. We are the only manufacturers in the United States making these yarns from the raw material to finished product and making yarns only.

Genapped Yarns of all kinds. Doup Yarns. Harness Yarns. For Braids, etc.

DYERS OF YARN AND SLUBBING. BRISTOL, R. I.

French System. **B. F. BOYER CO.,** Bradford System.
MANUFACTURERS OF
WORSTED AND WOOLEN YARNS,
Office and Mill, Delaware and Cooper Streets. CAMDEN, N. J.

Woolen and Merino YARNS
Eaton Rapids Woolen Mills,
EATON RAPIDS, MICH.

Woolen and Merino Yarns,
1 to 10 Runs, at reasonable prices.
All Wool, Mohair and Wool Spun or Mixed Cotton and Shoddy Yarns, in white, gray, and colors.
Dress Goods Yarns a Specialty.
E. M. ROCKWELL, - - LEOMINSTER, MASS.

RICHARD CAMPION,
SELLING AGENT FOR
Bristol Worsted Mills,
Highland Worsted Mills,
Loridan Worsted Co.,
17 Bank St., PHILADELPHIA, PA.

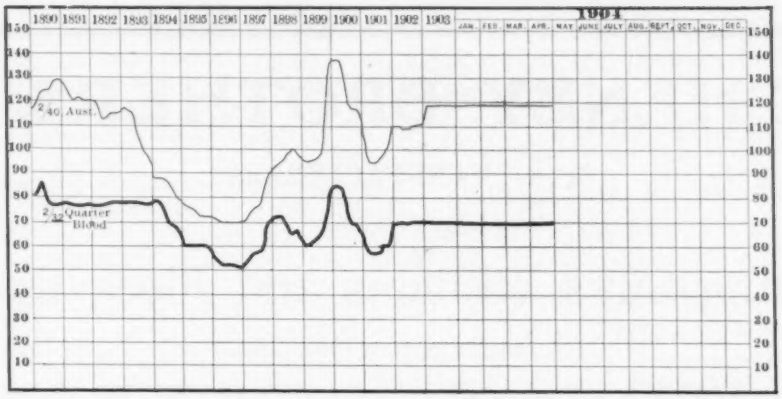

CHART SHOWING RANGES OF PRICE OF WORSTED YARNS.

Unless orders come forward in greater volume weavers will have to shut down. Many of the weavers have orders which will run them until July 15th.

The light weight season is not progressing very rapidly, but this may be changed as soon as the season is further advanced and the requirements are known. The clothiers are buying cautiously and are taking no chances—everything which goes to make a suit of clothes, from the labor to the cloth, is higher, but the clothiers can get no advance for their garments. The buyers of cloth are getting their supplies only from hand to mouth, and are hoping and looking for a decline in the cloth market; and this draggy business will continue until the price question has been satisfactorily adjusted. Piece dyes in half Blood quality are the styles which will sell best within the next sixty days. Fancy worsteds will not be run except in a cautious way. Some of the men's wear weavers are making ladies' dress goods in a check pattern.

The weavers are despondent at the immediate outlook, but after the present light weight season, and when the next heavy weight season comes around, the trade is looking for a good business, as the winter just passed has enabled the clothiers to clean out much old stock, and the coming heavy weight season will reap the benefit. This may seem a

SILK NOILS AND SILK NOIL YARNS
In White and Colors.
A. T. SKERRY & CO., 47 Leonard Street, NEW YORK.
MOHAIR LOOPS, KNOTS AND FANCY YARNS FOR DRESS GOODS & CLOAKINGS.

QUEENSBURY MILLS WORCESTER MASS.
MOHAIR TOPS AND YARNS FOR WEAVING
LUSTRE YARNS FOR SERGE LININGS
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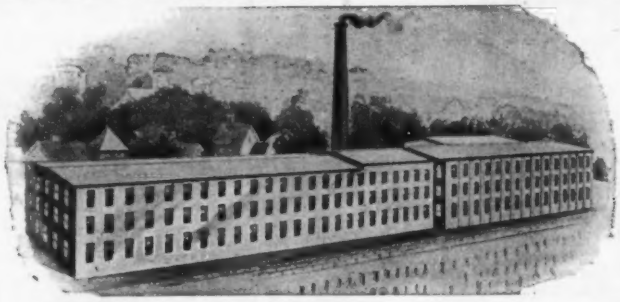
SPINNERS OF MOHAIR YARNS FOR ZIBELINES
DRESS GOODS YARNS
KNITTING YARNS
WORSTED YARNS
MOHAIR

CHENEY BROTHERS,

SILK MANUFACTURERS,

——ALL KINDS OF——

Knitting Silks, Ribbons and Piece Goods

USED FOR TRIMMING KNIT GOODS.

TRAMS, ORGANZINES and SPUN SILKS, IN THE HANK, OR ON CONES, FOR MANUFACTURERS' USE. SILK FOR SPECIAL PURPOSES MADE TO ORDER.

Mills: SOUTH MANCHESTER and HARTFORD, CONN.

SALESROOMS:

477, 479 and 481 Broome Street, NEW YORK.
929 Chestnut Street, PHILADELPHIA.
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WILLIAM RYLE & CO.,

Foreign and Domestic

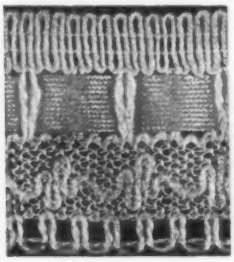
Spun Silk Yarns and Noils.

Domestic Thrown Silk of every description. Fine Pure Dye Silks for the woolen trade a specialty. Importers of European and Asiatic Raw Silk.

54 Howard St., cor. Mercer St., NEW YORK.

E. C. HARPER,
WORSTED and WOOLEN YARNS,
MERCERIZED COTTON,
395 BROADWAY, TEL. 1020 FRANKLIN NEW YORK.

Speed & Stephenson,
WORSTED and WOOLEN
YARNS
A SPECIALTY.
ALSO TOPS.
170 SUMMER ST., BOSTON.
Long Distance Tel. 4168-2 Main.



GEORGE W. CHAPIN,

BRAIDS Cotton, Worsted, Mercerized, Cotton and Silk Twilled.
TAPES Common, Twilled, Superfine and Plain 13 to 35s, white and colors on spools.
YARNS Cops, Skeins, Warps, Tubes and Cones.
THREADS on Spools, Tubes, Cones, Unbleached, Bleached and Colors for Manufacturers' use.
CROCHET LACE EDGINGS Latest Styles in Pant Laces.

229 Church Street 231 . . PHILADELPHIA

rather long look ahead, but is certainly something to anticipate. The bunting manufacturers are getting occasional government orders, but the regular demand is light. In times past a campaign year brought good business to bunting manufacturers, but the new laws regarding the use of flags for campaign purposes has spoiled this part of the business.

Weavers are making many complaints against the prices of 2/36's in quarter Blood quality. The dress goods manufacturers are losing much business because of the high prices of this yarn. Some fancy mixed yarns are being sold and some 2/50's hard twisted, but the business is slow.

Some hosiery knitters are using considerable English spun yarn, but the chances are that later they will see that English spun yarn will not give the satisfaction obtained with French spun yarn. This is conceded when it is considered that all the hosiery manufa turers throughout the world use French spun yarn. French spinners continue to run on orders secured early in the season. Some of the buyers are holding off from giving spinning instructions but new orders are coming to hand from time to time.

Combers are not busy, although prices are well maintained.

We quote as follows:

2/40's Australian	1.20
2/40's XX Delaine	1.10
2/40's Half Blood	1.05
2/20's Half Blood	.85
2/36's ⅜ Blood	.75
2/26's ¼ Blood	.68

Woolen Yarn

Spinners are looking for a hold-up during the coming summer—as they are not sure that the demands from the weaving mills will continue. Some of these weavers who hav. been running night and day have discontinued night work, and some woolen mills have orders which will last only until July.

HOFFMAN, DeWITT & McDONOUGH,
Manufacturers of
Diamond Stay Bindings
TRADE MARK
Tapes, Webbing and Bindings.
COTTMAN and G STS., PHILADELPHIA
Ryer's Station, P. & R. R. R.
Bell Telephone, 203 Cheltenham.

JENCKES SPINNING CO.,
Formerly E. JENCKES MFG. CO.
Carded and Combed Cotton Yarns for Weavers and Knitters.
Double and Twist Yarns for Woolen Trade.
PAWTUCKET, R. I.

WILLIAM B. CHARLES,
Cotton Yarns,
Cotton Cloth,
Silesia, Sateens,
For the Underwear Trade.
AMSTERDAM, N. Y.

GRANT YARN CO.,
COMBED AND CARDED COTTON.
YARNS 40's and above. AND
FITCHBURG, MASS. WARPS

FLOSSETTE MILLS
of the
New England Thread Co.
CENTRAL FALLS, - - R. I.
(DYERS and BLEACHERS) and MANUFACTURERS of
High Class Threads on Tubes, Spools and Cones and MERCERIZED YARNS for Knitting.
GLAZING OF YARNS
For the Shoe Lace. TAPE and WEBBING TRADE

C. MOORE & CO.,
Manufacturers of
TWINES, THREADS AND YARNS,
Jacquard Harness Twines of all kind on hand and made to order.
S.W. Cor. Fifth and Market Sts., Phila.

American Cotton Yarn Exchange
COMBED and CARDED
COTTON YARNS
From Northern and Southern Mills.
American, Egyptian, Peruvian and Sea Islands.
ARNOLD B. SANFORD, Pres. and Gen. Mgr.
PERCY H. de MAURIAC, Vice President.
OFFICES: 67 Chauncy St., Boston.
240 Chestnut St., Philadephia.
108 Franklin St., N. Y. with James Talcott.

WEIMAR BROS. MANUFACTURERS OF Cotton Mercerized Tapes,
SPOOL TAPES, BINDINGS AND NARROW FABRICS FOR UNDERWEAR AND OTHER TRADES.
Phone Connections. Works, 2046-48 Amber Street, PHILADELPHIA, PA.

FAULTS!

If you see fluid oil going to waste every day around your mill and don't send for a free sample of **NON-FLUID OIL,** that's your fault.

If you do try a sample and don't send us an order afterward, that's our fault—but we have mighty few faults of this nature.

N. Y. & N. J. LUBRICANT COMPANY,
17 Church Street, NEW YORK CITY.
14 McAllister St., SAN FRANCISCO.

JOSEPH M. ADAMS CO.
WOOLEN YARNS,
Carpet Backing and Rug Yarns a Specialty.
ARCOLA MILLS,
Main St., foot of Centre St., Manayunk, Phila.

Knitting and Weaving
YARNS.

Cones, Cops, Warps, Skeins,
Single, Double, Three-Ply, etc.
Peeler, Egyptian, Mixed Colors.
Large Assortment.

EDWARD S. HYDE,
226 CHESTNUT STREET,
Philadelphia, Pa.

SOUTHSIDE WOOLEN MILLS
Woolen Yarns
For Weaving and Knitting Purposes.
JAMESTOWN. .. NEW YORK.

YARNS Solis, Boston.
77
SUMMER STREET.
ANDREW J. SOLIS, Jr. & CO.

Some of the hosiery manufacturers are using English spun worsted yarn. The spinners are beginning to deliver on orders taken for fine fleece-lined underwear yarn. Hosiery manufacturers are calling for yarn.

The spinners who have taken orders calling for a percentage of Peruvian are not feeling happy, as there is not much Peruvian cotton on hand, and the prices have advanced to 25 cents per pound with a strong probability of its going to 30 cents per pound. The result of all this is that spinners who have taken orders for yarn made with a percentage of Peruvian cotton are selling at a loss, as many did not cover for cotton at the time the orders were placed.

Spinners are making much yarn for fine flannels. This yarn is made from Peruvian cotton and Australian lambs' wools, and spinners are urging upon weavers the necessity of placing orders early as lambs' wool is scarce.

The knitters throughout New York State on men's wear are busy. Some of the mills are running until nine o'clock at night. This is true, the mills making heavy weight underwear and using but little cotton. The mills making underwear and using cotton are running short time. The mills making flat goods and spinning cotton are shut down. They say they have orders enough, but at the present price of cotton they will lose money on every dozen turned out.

The balbriggan manufacturers using combed cotton yarn are likewise in a bad condition, as the price at which they can buy yarn and the price at which they can afford to pay is about four cents off. As the spinner and the knitter cannot get together there are no orders being placed for combed cotton yarn, and mills are shutting down.

The Rag and Shoddy Market.

The market for both rags and shoddy is in a waiting condition. The small demand for manufactured goods has reduced the consumption of shoddy and until there is a revival of activity in the weaving mills there is no likelihood of a change for the better in the market for raw material. Prices remain unchanged, but quotations are nominal as the actual business transactions are of very small proportions. The general condition is the same as that found in all other branches of the textile trade at present. Buyers of rags and shoddy are confining their purchases to actual requirements and taking no risk by ordering more than their sales of the manufactured product warrant. We quote as follows:

SHODDIES AND EXTRACTS.

White yarn, best all wool	38-40
White knit, all wool, best, fine	28-32
White knit, No. 2	23-25
Light yarn, extra fine	25-28
New pure indigo blue	23-25
Merino.	
Fine light, all wool, No. 1	24-25
Medium light, all wool, No. 1	16½-17½
Medium light, all wool, No. 2	14-16
Fine black, all wool	20-22
Fine dark, all wool, best grade	20-21
Medium dark, all wool, No. 1	13-15

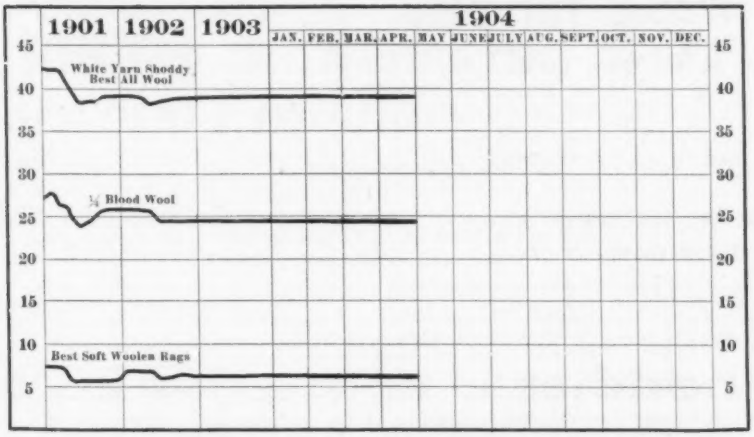


CHART SHOWING RANGE OF PRICES OF SHODDY, RAGS AND NOIL.

Medium dark, all wool, No. 2	12-13
Red knit stock, strictly all wool	19-20
Red flannel, all wool	19-20
Dark blue for hosiery, strictly all wool, No. 1	17-20
Dark blue for hosiery, not all wool, No. 2	12-14

DELAINE EXTRACTS.

Light	19-22
Medium light	15-17

WOOLEN RAGS.

Regular gray	12-13
Black	14-15
Fancy colors	16-20
Fine merchant tailors, all colors	9-11
Choice light colors	13-15
Browns	12-13
Blacks	9½-10½
Fine blues, plain	9-11
Fine dark	10-11
Medium dark	7-8

Worsteds.

Blue	16-18
Black	18-20

Serges.

New black	15-16
New blue	14-15

Flannels.

New scarlet	18½-22
New blue	17-18
Cloakings	3-4

SOFTS AND KNIT STOCK.

Soft woolens, best	7-7½
Old white flannels	14-16
White flannels, No. 2	11-12
Old red flannels	9½-10
Light blue flannels	7½-9
Old blue flannels	6-7
Fine worsted, new black	26
New blue clip, best, fine	20-22
Dark mixed yarn, extra fine	22-24
All wool yarn, medium and coarse grades	15-20
Old plaids	5-7
White stockings	17-18
White hood stock	20-21
Clear hoods	9-10
Red stockings	9-10
Blue stockings	7-8
Fancy stockings, No. 1	7-9
Gray stockings	9-10
Black stockings	9-10
Knit stock comforters	6-7½
Red knit	9-10
Light gray knit	9-10
New light fancies	16-18
New fancies	12-14

Merinos.

Light, fine	13½-15
Light, coarse	7½-8
Fine, dark	12-13
Dark, No. 2	8-9
Coarse dark	5-6
Blue	12-13
Blue-seamed	13-14
Black—unseamed	12-13
New black	18-20
Small	3¼-4
Bunting	6-8

FLOCKS.

Shear, fine white, all wool	9-11
Fine indigo blue, all wool	9-9½
Fine black, and blue, all wool	7-8
Fine dark, all wool	5-6
Gig, fine, all wool	3-4
No. 1, black, all wool cut	6-7
All wool, fancy, shear and gig	2½-3½

COTTON WASTE.

No. 1 Spinners	12-12½
No. 1 Machine	7-7½
No. 2 Machine	5½-6¼
Machine Cop	8-8¼
No. 1 Cop	10½-11
No. 1 Card	12-12½
No. 2 Card	10½-11½
No. 1 Oily Card	6-6½
No. 2 Oily Card	5-5½
Egyptian Card	None in the market
Peeler Combing	13½-14
Egyptian Combing (scarce)	None in the market

Cotton Waste For Sale.

Have large lines of Soiled Card, white and colored Oily Card and other Cotton Wastes suitable for the manufacture of Cassimeres, Satinets, Unions, etc. Also Combers and other clean Cotton Wastes for Hosiery, Underwear, etc.

CHAS. W. BECKER, Agt.,
Amsterdam, N. Y.

Address Dept. 7.

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ED. GLUECK, Sec. and Gen. Mgr.

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Of every description. Capacity 7,000,000 pounds per annum. Custom Carbonizing and Garnetting a Specialty.

New York Office. 140 DUANE STREET. **RIVERDALE, NORTHBRIDGE, MASS.**

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Cotton and Cotton Wastes

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Contracts made with Cotton and Woolen Mills for Yearly Waste Production. Correspondence solicited. Shepperson's Code, 1878. Cable Address "Charles."

Established 1848. Telephone Connection.

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Manufacturer of

Fulling and Scouring Soaps

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MILL SOAPS a Specialty. PHILADELPHIA.

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So it costs you NOTHING to have the AMERICAN WATCHMAN'S CLOCK. Fully approved by all insurance companies. We equip factories with Fire Alarms, Signals, etc., also Employee's Time Recorders, and Telephone Systems. Electric Time System consists of Master Regulator in office with secondary electric clocks throughout the mill, insuring accurate time. Send for particulars.

Pettes & Randall Co., 150 Nassau St., New York

No. 1 Linters	6½-7
No. 2 Linters	6-6½
White Clips	8¾-9¼
Colored Clips	5½-6½
No. 1 Picker	2-3½

NOILS.

Australian	48-50
Fine domestic	38-40
½ Blood	24-28
⅜ Blood	22-23
¼ Blood	17-19
Braid	21-22
Carpet (white)	14-18
Carpet (colored)	10-12½

Seedy.

½ Blood	35-37
⅜ Blood	27-30
¼ Blood	23-26

Coarse Cotton Counts in England.

A recent reference in our Technological columns to "bump" yarns below 5's count has provoked the inquiry—very natural from a fine-spinning quarter—whether any yarns are spun of so coarse a sort. As a matter of fact, waste or shoddy yarns, which occasionally spin up to 7's or 8's count, are more commonly produced in numbers below 5's; they go down as low as 0.5 hanks per lb., or equal to 26 yards per oz. "Bump" is the name given to the very coarsest numbers, say 2's and below, considerable quantities of which yarns are spun in the neighborhood of Stockport, Bolton, and Bury. We once heard a piecer, who was more accustomed to spinning 100's to 150's fine yarns, describe these low numbers as "nowts" and "double nowts," meaning 0's and double 00's—a not inapt designation. The system of numbering is used by waste spinners for yarns up to counts equaling 5 hanks per lb.—Textile Mercury.

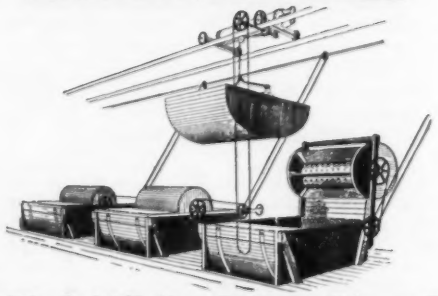
Smith, Drum & Co.

2503-9 CORAL ST., PHILA., PA.

Dyeing Machinery

FOR WARPS AND PIECE GOODS

Bleaching Machines



Circulating Dyeing Machines. For Hosiery, Underwear, Raw Stock and Rags. Singeing Machines for Hosiery. Mercerizing Machines.

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Dyers and Finishers of Dress Goods, Men's Wear and Cloakings, such as Venetians, Armures, Soleils, Crepons, also Silk Warp Fabrics, Cotton Warp Linings, Suitings, Clays, Serges, Worsted Damasks, Tapestries and Shirtings.

Particular attention given to Fast Colors on Cotton and Worsted Yarns, Slubbing and Stock Dyeing. Special Black for the Silk Trade on Fine Cotton Yarns.

MAIN OFFICE AND WORKS:

York, Emerald and Adams Streets, PHILADELPHIA.

NEW YORK OFFICE: Silk Exchange, 487 BROADWAY.

PERFECT FAST BLACK FOR HOSIERY AND YARN THAT WILL NOT TENDER THE GOODS.

The Dubois Latest Improved "Sanitary" Oxidize Fast Black Dyeing with Lisle Thread Finish Process, Patented March, 1903, Leads Them All.

This is the most reliable dyeing formula in existence for the dyeing of cotton hosiery. It has been adopted successfully by many of the leading manufacturers, numbering to this date to thirty-four mills. It has the following invaluable quality, viz:

"It always gives uniform shade, oxidizes and lisles quick, and leaves the fabric almost as strong as they were before dyeing, and because of its quick oxidizing and lisleing and not tendering the goods it stops overtime and night work and does away with mending. But most important of all, it is the only dye liquor that can be compounded to suit the seasons of the year and stand the hottest weather of the South without in the least interfering with its good qualities."

The cost of this black is as follows:—$1.50 per 100 ponnds for the ordinary black, and $1.80 per 100 pounds for the best, for all chemicals used, labor and steam extra which is very small.

This valuable dye formula with its Lisle Thread Finish Patented process can be bought in a lump sum, or be made use of on paying a small monthly royalty per 100 pounds of goods dyed. The advertiser will go to your mill and personally teach the dyeing, oxidizing, lisleing and finishing, and stay with you until you thoroughly understand all the particulars. Will contract for your complete oxidize dyeing plant with my stationary or rotary oxidizing apparatus with electric thermometer, patented June, 1901 and June, 1902, of which I am the only manufacturer.

NOTICE:—Will be pleased to give highest references on large mills with party meaning business as to above claims.

N. B. I hereby give notice to the general public that I have not and never have had any connection with the O. & P. Rothe Mfg. and Supply Co., Ltd., of Norristown, Pa., and that their advertisement of offering formula for "Sanitary" Fast Black is without my consent.

The "Sanitary" Fast Black Formula is exclusively of my own invention as far back as 18 years, and anyone that buys this valuable formula is always bound to keep it secret, and no one else has the right to use it or sell it.

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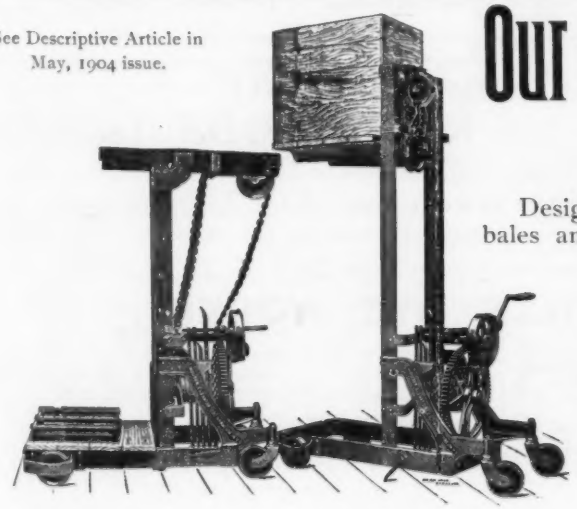
See Descriptive Article in May, 1904 issue.



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Dyers and Bleachers of Cotton Yarns in long or Short Chain Warps and Skein, in FAST COLORS, FOR BLEACHING PURPOSES, Cross Dyeing, Ginghams, Etc.

Also Dyers of Turkey Reds and Indigo Blues for all purposes in either Warp or Skein.

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Correspondence Solicited.

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OF ALL CLASSES OF LINEN GOODS.
Toweling and Damasks a Specialty.
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Does the Best Bleaching at the Most Reasonable Rates?
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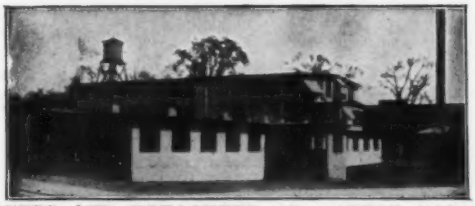
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BLEACHING, DYEING and MERCERIZING of all grades of Cotton Yarn,
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Direct, Sulphur and Oxidized Black, Fast and Stainless Colors on Merino Yarn. Fast Milling and Alizarine Colors on Wool.
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For Raw Cotton, Yarns, Warps and Piece Goods, indestructible by light and acids, absolutely fast to scouring.

ONE OPERATION. NO AFTER-TREATMENT.

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A NEW DIRECT DYEING SULPHUR BLACK FOR COTTON

Fast to Light, Air, Alkali, Acid and Strong Soaping. Requiring no fixing with Metallic Salts nor Atmospheric Ageing,

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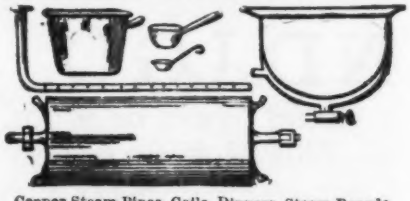

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The best scour for wool in the world.
A perfect solvent of grease in any form, can be used on Raw Wool, Yarns, or Piece Goods.
Does not injure the fibre, and leaves the wool clean, soft and lofty.
Sold entirely on merit. Order a barrel for trial.
Will cost you nothing if unsatisfactory.

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Sulphide of Sodium

Purest and Best Made.

Safest to use with the Sulphur Colors.

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Aniline Colors and Dye Extracts.

New Vilal Black Extra

An Improved Sulphur Black.

THE LATEST NOVELTIES IN DIRECT FAST GREENS

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New fast one-dip sulphur colors standing acid, alkali, sunlight, etc. No after treatment required.

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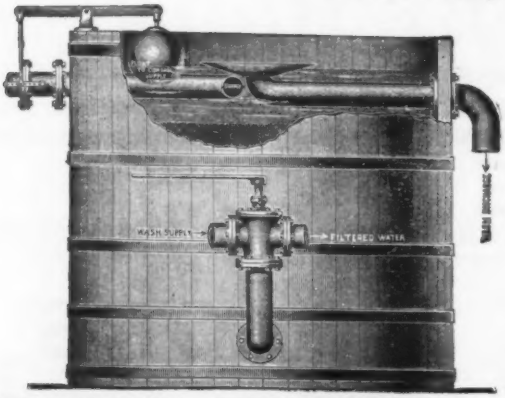

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Our filters are already in use in a number of the representative textile mills of the country, from whom we have received many expressions of satisfaction. Our representative will call and explain our system whenever desired.

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Printing Rollers
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Our Guarantee:

Superior Quality. *Prompt Shipments.*

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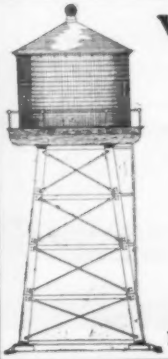

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STEEL TOWERS AND TANKS

For Fire Protection.

DYE TUBS, VATS AND TANKS FOR EVERY PURPOSE.
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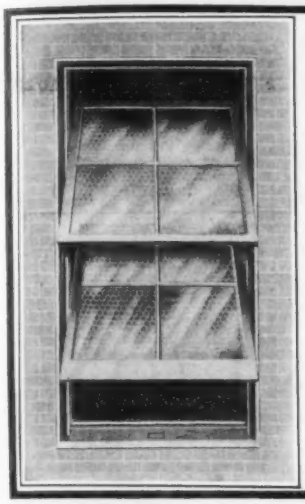

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A window of original design and superior hollow-steel construction; glazed with wired glass. A window that possesses the advantages of being practicably revolving (sliding sashes) and dependably automatic closing. A window that effectively bars the entrance of flames. In short, a window such as you will want to have used in operations you control.

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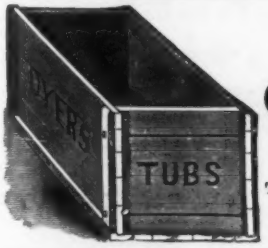

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Tubs and Tanks of all kinds for Dyers, Bleachers, Factories, etc.

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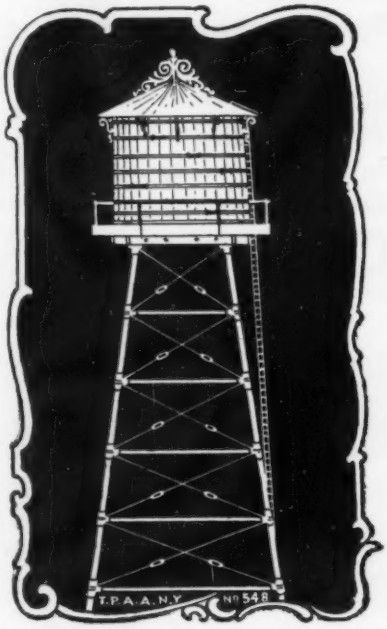

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To warrant spending money on poor equipment of any sort.

The Caldwell Red Cypress Tank

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cost little more than the cheap kind, and are incomparably more safe and durable. Hooping is so exact that bursting of tank is impossible, and tower so strong that collapse is out of the question. Our catalog and price list is free.

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For Removal of DUST, HEAT, ODORS, STEAM, SMOKE, MOISTURE AND GASES, AND FOR ALL SORTS OF . . . . . .

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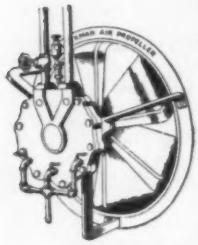
With Direct Connected Engines.



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Can be run at any speed and any time. No long shafting and belts to waste power.

For Dye Rooms, Factories, Boiler Rooms, or where there is moisture or dust they are the best apparatus ever installed.

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Perforated Copper

For Wool Scouring, Renser Boxes, Dyeing of Raw Cotton. Duster Screens, Picker Screens.

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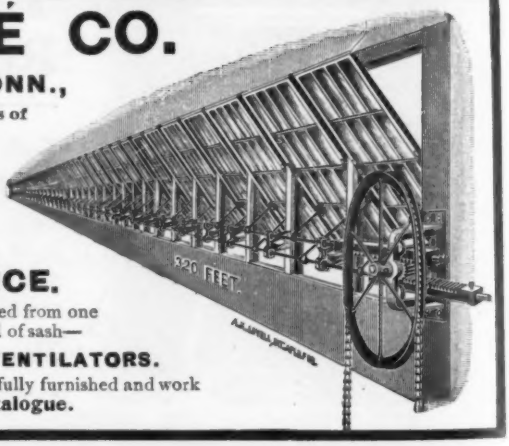

A line of sash 500 feet long can be operated from one station if desired. Adapted to any kind of sash—

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Correspondence solicited. Estimates cheerfully furnished and work guaranteed. **Send for Catalogue.**

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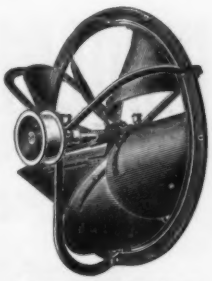

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An Effective Label

well put on, wire costing one cent per 1000 stitches.

Complete Outfits of

Printers Machinery

Book Binders Machinery

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An extract from purchaser's letter:

Gentlemen:—
Since using your Brehmer Wire Stitching Machine, we have impressed on each garment over 2000 dozen at a cost of only 40c. outside the price of machine. Whereas the same amount of pin-fastners would have cost us $13.20.

STAR KNITTING CO., Cohoes, N. Y.

Chas. Beck Paper Co., Ltd.,
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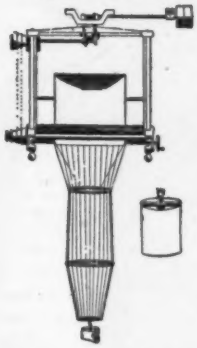
The Johnston Patent Improved Vertical Dryer



IS an absolute improvement over any other Dryer made. Simplicity of operation. Superiority of construction and work done. Economy of labor, hot air and room. Suitable for either extra heavy or the thinnest make of goods.

Sole Owners and Manf'rs

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Send for circulars and prices.

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GAS ENGINES for city or country
BRUSHING MACHINERY
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EFFICIENT
DURABLE
LOW IN PRICE

THE CYPRESS LUMBER CO.

TWO BIG FACTORIES.

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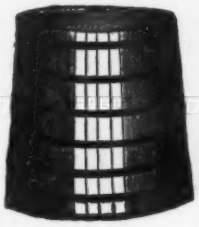

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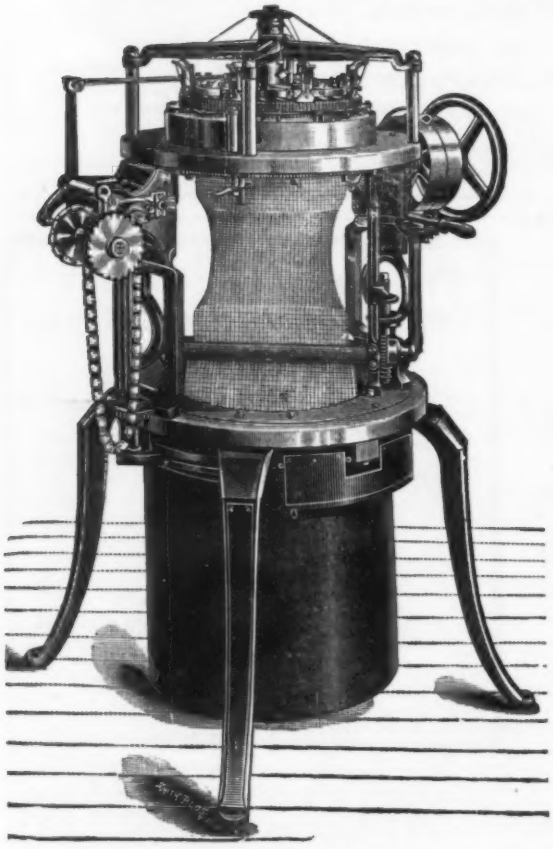
McMICHAEL & WILDMAN MFG. CO.

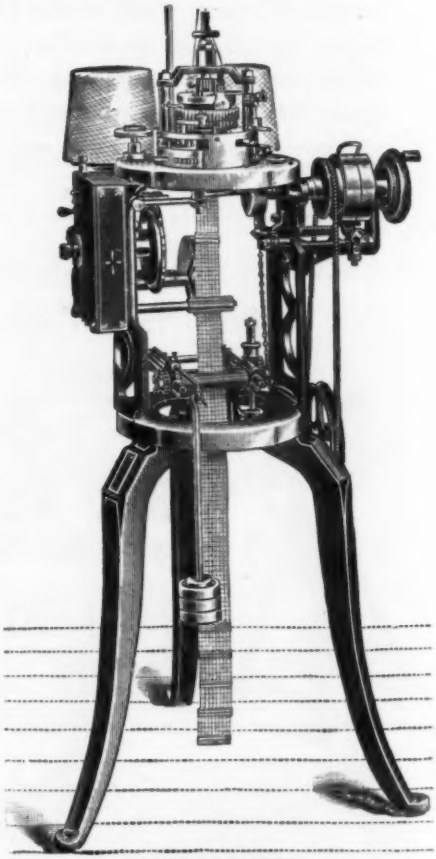
CIRCULAR RIB KNITTING MACHINERY

AUTOMATIC AND PLAIN

For all classes of Ribbed Hosiery and Underwear, Combination Suits, Sweaters, etc.



AUTOMATIC BODY MACHINE.



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ESTABLISHED REPUTATION FOR LARGEST PRODUCTION, BEST QUALITY FABRIC, DURABILITY, ECONOMY OF OPERATION

Full Particulars, Description and Samples Furnished upon Application to the

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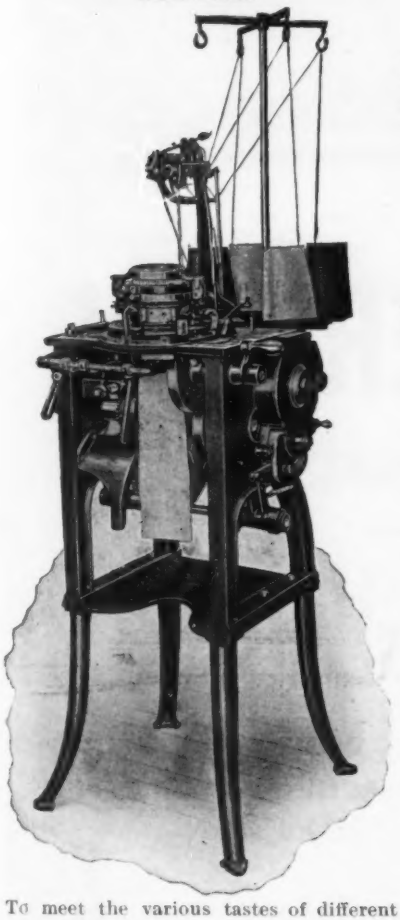
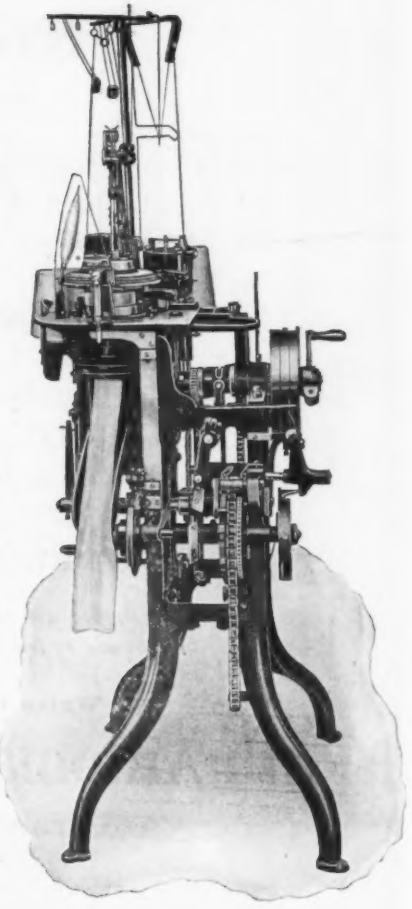


The Two Leaders

Fully Automatic Hosiery Knitters

For Making all Kinds and Gauges of Seamless Hosiery

HEMPHILL



One with

GEARS

the other with

CHAIN

for pattern mechanism

To meet the various tastes of different manufacturers. Both used and approved by leading hosiery manufacturers.

Both contain all the well-known essentials demanded of first-class knitting machines.

With these two machines we can supply all the manufacturer's possible wants in the best possible manner.

Write us for further particulars and prices.

We also make all kinds of LATCH NEEDLES.

Many leading manufacturers use our needles and say they are the best on the market.

Send us a trial order.

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This machine can be seen in operation at his office.

Mayo Knitting Machine & Needle Co., Franklin Falls, N. H.

Philadelphia Office: Knickerbocker Bldg., Cor. 6th and Arch Sts.

Watch This Space

FOR THE ANNOUNCEMENT OF THE

RUTH UNDERWEAR

MACHINE

Do not place your orders for your Underwear machines until you will have learned of the attractive features in connection with this, the latest product from the "Home of Improvements in Knitting Machines."

The **RUTH RIBBER** is well known for its economy in every particular, the **NEW UNDERWEAR MACHINE** will take its place at the TOP alongside of the RUTH RIBBER and all other RUTH PRODUCTS.

Write to-day for any Knitting Business information.

A TRIAL IS ALL WE ASK!

"Our doubts are traitors and make us lose the good we oft might win by fearing to attempt."

Write for Samples of Fabrics.

Ruth Automatic Knitting Mch. Co.

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Every machine being guaranteed to do all for which it is constructed eliminates any risk in purchasing. WHY HESITATE?

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NEW LINE OF

EDGINGS FOR 1905

Superior in Design and Finish

Embracing New Effects,

Now Ready for Inspection.

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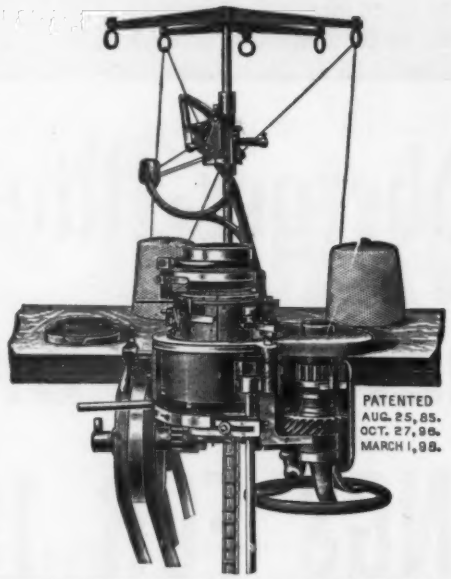
The "INVINCIBLE"

The "INVINCIBLE" is reasonable in price.

It's best advertisement—the recommendation of its users.

Its METHOD of TRANSFERRING is still the best.

Others try to imitate.



Full Automatic Knitting Machine

"The Knitter That Knits."

Leads Them All.

Write for Catalogue.

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E. JENCKES MFG. CO.

Factory and Main Office, PAWTUCKET, R. I.

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The Merrow

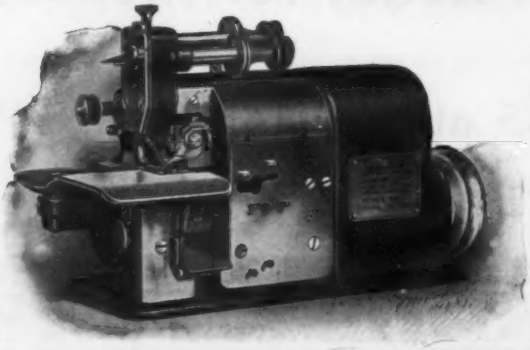
High Speed Overseaming, Overedging and Scallop Stitch Machines

are LIGHT RUNNING, FAST and DURABLE.

OUR NEW STYLE 60 MACHINE for Trimming and Overseaming in one Operation produces the strongest, best Seam and does it with the greatest economy.

STYLE 35 B SHELL MACHINE

For Necks and Fronts of Rib Goods, produces the most showy, substantial finish.



USE STYLE 17 or 22 for Bed Blankets and STYLE 18 for Horse Blankets.

Send for Catalogue and Samples.

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SUCCESSORS TO

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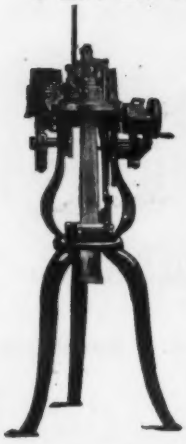

Knitting Machinery,

INCLUDING

Pepper's Flat Ribbed Cuff Machines,

Automatic Welt and Loose Course Machines for Stock Tops. New Circular Stripers with Welt, Loose Course and Striping (Automatic), for Short Cuffs, Sock Tops, Hose Legs, Wristers, etc.

Golf and Bicycle Stocking Machines,

ALL KINDS OF

CIRCULAR RIBBED MACHINES

For Men's Underwear, Ladies' and Misses' Hose Legs and Leggins. **Correspondence Solicited.**

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MANUFACTURER OF

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Flat and Circular Rib, both Spring and Latch Needle, Plain Circular Machines, Lead or Trick Cylinder. **Spring Needle Cylinder Rib-Top Machines,** for making Cuffs, Drawer Bottoms and Shirt Borders. **Spring and Latch Knitting Needles, Burr Wheels, Burr Blades, Sinkers, Jacks, etc.**

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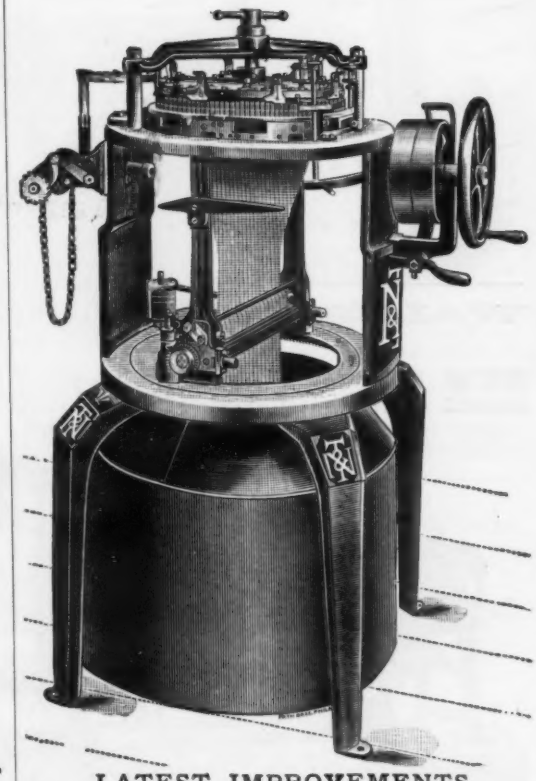
Circular Rib Knitting MACHINERY

For making Ribbed Underwear, Combination Suits, Sweaters, Cuffs, Shirt Borders, Hosiery, etc. : ; :

Correct Construction. Excellence and Durability.



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QUALITY OF FABRICS AND PRODUCTION

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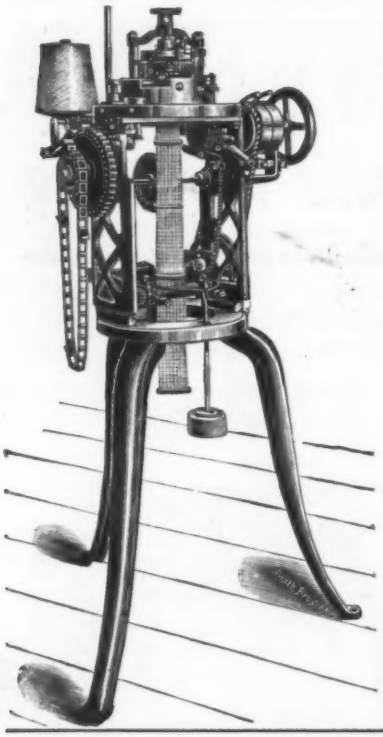

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213-215 Race Street, Philadelphia, Pa.

BUILDERS OF

Knitting Machinery

For HOSIERY and UNDERWEAR.

Complete Estimates Furnished. Send for Particulars.

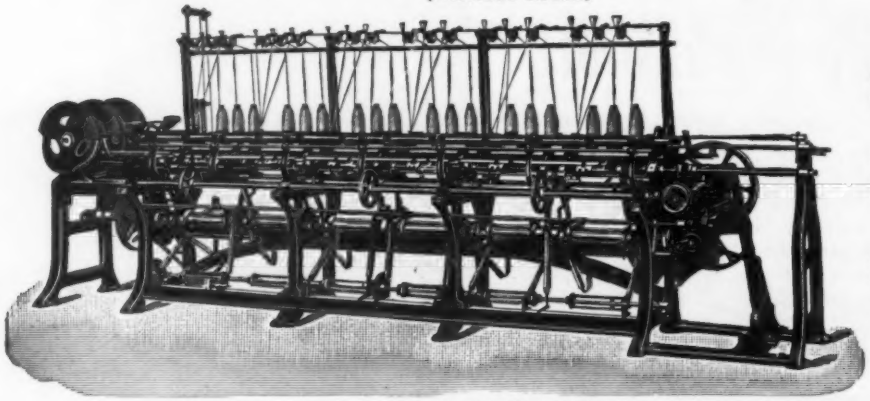
The cut shows our **Improved Automatic Ribber** with Welt and Slack Course for Half Hose, Tops and Ribbed Legs.

WALTER SCHOEBEL, 101 Ralph St., BROOKLYN, N.Y.

SOLE AGENT FOR THE UNITED STATES FOR

NEW The "Record Narrowing" Flat Knitting Machine NEW

(WITHOUT LOCKS)



The "Record" excludes any breaking of needles.

The "Record" runs very lightly and with the greatest quietness.

The "Record" narrows after a new method.

HIGH PRODUCTION.

BUILT SOLELY BY

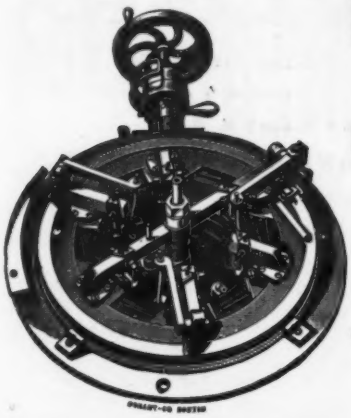
IRMSCHER & CO., Dresdener Knitting Machine Factory, DRESDEN, SAXONY.

This new invention, working after an entirely new method, is a combination of the COTTON and FLAT Knitting Machine with Automatic Narrowing Apparatus, for the production of full fashioned goods, seamless legs of ladies' hose, plain, seamless drawers, Shaker and cardigan sleeves, etc.

"THE RECORD" is also built without narrowing attachment for making 2 and 2 ladies' vests, shaker bodies, sweaters in 1 and 1 half and full cardigan, rib tops, etc.

All goods produced on the "Record" have more elasticity and are of finer manufacture than any other machine of its kind.

SPECIAL HAND AND POWER MACHINERY FOR FANCY GLOVES, SWEATERS, GOLF HOSE, LADIES' BLOUSES, ETC.



CIRCULAR KNITTING MACHINES

Either plain or full automatic, with stop motions complete, for

Ribbed Underwear, Sweaters, Cardigans, Cuffs and Anklets.

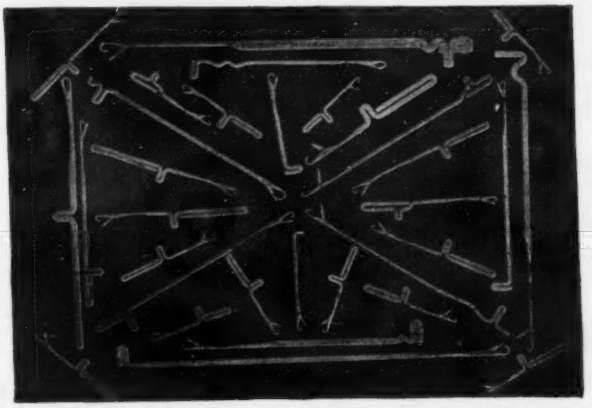
The Leighton Circular Machines are the only ones which **Rack** or **Shog** the needles for fancy borders; also built for automatic striping; and with from 4 to 16 feeds for underwear.

Also Builders of ABEL WINDERS, SEAMERS and LOOPERS.

LEIGHTON MACHINE CO.,
Manchester, N. H.

Latch Needles

For all Knitting Machines.



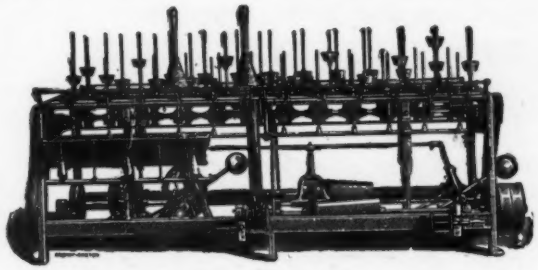
Our Superior or Sunken Rivet Head Needles

Will save you money every day in the year.

Dodge Needle Co., Manchester, N.H.

We now build, with or without differential motion, for winding on Bobbins from Skein or Cop,

THE ABEL WINDERS



ALSO THE

Abel Seamers and Loopers

IN CONNECTION WITH OUR LINE OF

AUTOMATIC RIB KNITTING MACHINERY.

LEIGHTON MACHINE CO., Manchester, N. H.

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835 Arch Street, - - - Philadelphia, Penn.

KNITTING MACHINERY

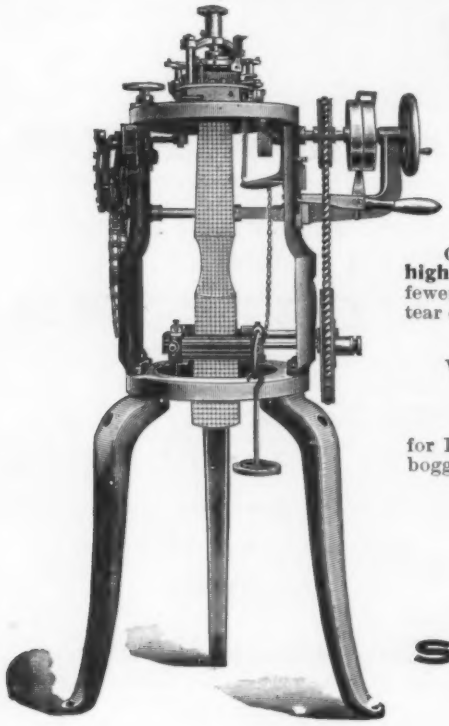
OF ALL KINDS. NEW AND SECOND HAND.

A RARE OPPORTUNITY TO BUY.

50 New Victors, various sizes.
28 Beattie & Hepworth loopers.
3 Cornely embroidery machines.
10 Hosiery presses (Lever). 2 Screw presses.
1 Hollow plate press.
3 Hemphill machines, 3¾ inch, 160 needles.
150 Ribbed underwear machines, various sizes and makes.
1 Speed lathe. 1 Sensitive drill.
60 Brinton & Co. ¾ aut. knitters, sizes.
27 Standard A machines.
56 Union Special machines.
1 Singeing machine. 2 No. 50 Merrow machines.
12 Mayo machines, 176 needles.
100 Brooks welters. 4 Jones' fleecing machines.
98 Brinton & Co. and other make hosiery ribbers.
6 Invincible machines, 176 needles, almost new.
40 Ribbed shirt machine cylinders and dials, all sizes, cuts and makes.
1 Payne winder, 24 spindle.
50 National spring needle machines.
1 Sandusky mangle, 60 inch.
1 26 inch belt driven extractor.
4 Old style Jackson winders.
2 Lindsay & Hyde Winders.
1 No. 35 Merrow small shell machine.
1 Industrial over-seamers.
1 plant underwear machinery.
2 Cyclone hosiery dryers.
5 Band Folding and Cutting machines.
4 Allen skein winders.
1 Payne 12-spindle skein winder.
2 Standard B machines, 84 needles.
1 Standard B machine, 200 needles.

WRITE FOR COMPLETE LIST.

We are always in the market to buy good second-hand Knitting and Finishing Machinery.



High Speed Rib Knitting Machinery.

Our latest model machinery has been designed to run at **very high speed**, giving large production. This is accomplished with fewer seconds, less breakage of needles, less jar and wear and tear on machines than has been customary at lower speeds.

We also make Special

STRIPING AND DESIGNING MACHINES

for Fancy Golf Stockings, Bathing Suits, Sweaters, Toques, Toboggan Caps, Skirts, etc.

Our Machinery gives large production at low cost and enables manufacturers to meet the market always and make a profit.

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LITTLE FALLS, N. Y.

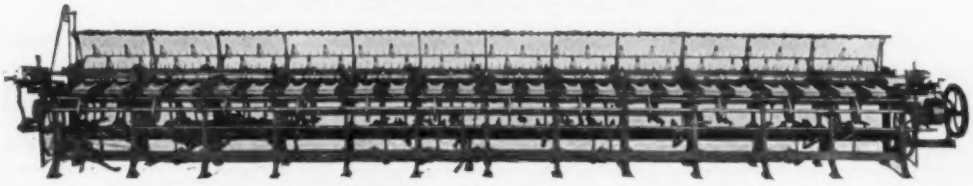
FULL-FASHIONED HOSIERY MACHINERY

.. BUILT BY ..

Chemnitzer Wirkwaaren-Maschinenfabrik

(Formerly SCHUBERT & SALZER)

CHEMNITZ, GERMANY.



HALF-HOSE LEGGER OF 24 SECTIONS.

All classes of flat work machines for full-fashioned hosiery in all gauges, from 21, 24, 27 up to 51 guage, from 12-24 sections, also machines for full-fashioned shirts and pants in all guages from 6-10 sections, with narrowing and widening.

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CUTTING MACHINES

Made to be operated by direct current, 110 or 220 volts.

What electric current have you?

UNIVERSAL CUTTER will do the work BETTER and cut a GREATER quantity of Knit Underwear, or Fleeced Materials, than any other Cutting Machine on the market. : : : :

Made in 3 sizes Circular Knives:—Gem, 3 1-4 inch Knife, weight 15 lbs.; Prima, 4 inch Knife, weight 24 lbs.; Giant, 5 1-2 inch Knife, weight 27 lbs. Two sizes straight or Reciprocating Knives. Send us sample of material you desire to cut, stating thickness you want to cut at one time, and we will advise you as to which size is best adapted to your wants.

SMALL RIB MACHINES
CROCHET MACHINES

NATIONAL

SHELL STITCH
MACHINES

Spring Beard Needle Machine
For SEAMLESS HOSIERY, Plain and Novelties

Automatic Rib Machine
For RIBBED UNDERWEAR. All Styles and Gauges

Over Seam Machine "Champion Improved"
For Welting Seamless Hosiery. Covering Raw Edges of Rib Fabrics.

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SEND FOR FULL PARTICULARS
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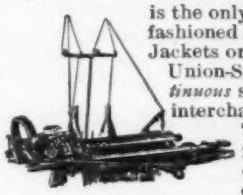
316 and 318 Florist St.,
PHILADELPHIA .. .. PENN.

The best equipped shop in the United States for the Manufacture of

Knitting Machine Cylinder

and Sinker Bed Ring Forgings, from the smallest to 30 in. dia. of the best steel.

The Grosser PATENT FLAT KNITTING MACHINE



is the only reliable machine for full-fashioned Sweaters, Cardigan or Golf Jackets or Vests, Gloves, Underwear, Union-Suits, etc., that gives *continuous* satisfaction. All parts are interchangeable on our new style. The only automatic Machine for Jacquard Honey-Comb or Seamless Shaker Sweaters. We have the only first class High Speed 2 thread Lockstitch Overseamer for selvedged Knitgoods, that will sew in Sleeves or hem in double Bottoms on Sweaters without puckering. *ARTHUR MUELLER, 780 Madison St, Brooklyn, N. Y. Telephone 665a Bushwick.*

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Importer and Builder of

Full Fashioned Knitting Machinery

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Builders of
Steam Presses,
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Chromers,
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Hosiery and
Laundry
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Complete
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3-4 AUTOMATIC KNITTER

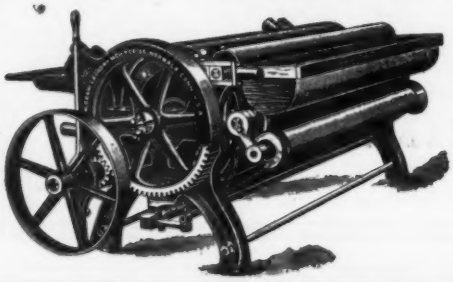
FOR ALL KINDS AND GUAGES OF SEAMLESS HOSIERY.

Has the preference wherever used over 7-8 and full automatics. Because it makes as much or more goods and better goods. Costs less for repairs. Gives less trouble to fixers. Range on Half Hose, from the coarsest to 260 needle.

Exclusive rights to BROWN'S ATTACHMENTS FOR LACE EFFECT.

Cylinders and Dials for all size Machines. **127 Bread Street, Phila.**

AUTOMATIC IRONING and PRESSING MACHINE for KNIT GOODS.



This machine irons and presses ribbed and flat underwear, giving a fine, smooth finish and most attractive appearance to the goods, not to be obtained in any other way. It does not break buttons. Inexpensive and easy to operate, and has large capacity. Knitting mills using them are greatly pleased with results. This method of finishing is sure to come into universal use. Send for further particulars to

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Patent Single-Stitch

LOOPING MACHINE.

Needle working from the inside, avoiding the breaking of needles and points and picking up the metal.

Single and Double Stitch, or Both Combined.

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Hosiery Embroidering Machine

(Universal Feed, Bonnaz System)

Producing chain stitch on circular and tubular goods like

Hosiery, Gloves, Mittens, Etc.

with cotton, silk, floss or other materials.

The Universal feed motion permits the production of simple or intricate designs without turning the materials to be embroidered.

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BUILDERS OF

Full Automatic Knitters

WITH OR WITHOUT

Transferring Device

ALL SIZES AND GAUGES, 2 1-4 INCH TO 4 INCH

MEADOW AND WASHINGTON STREETS ALLENTOWN, PA.

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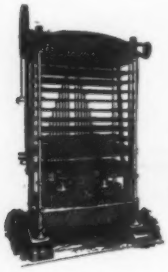

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For Knit or Woolen Goods.

The most reliable machine of the kind on the market.

PRESS PAPERS and FENDERS.

SPENCE & RIDEOUT,

Successors to
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Established 1868.

Hegeman Seamless Bobbin Cover.

The best, cheapest and most satisfactory covering for winder bobbins. Will fit on any style or size.

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BOARDS FOR FAST BLACK DYERS.

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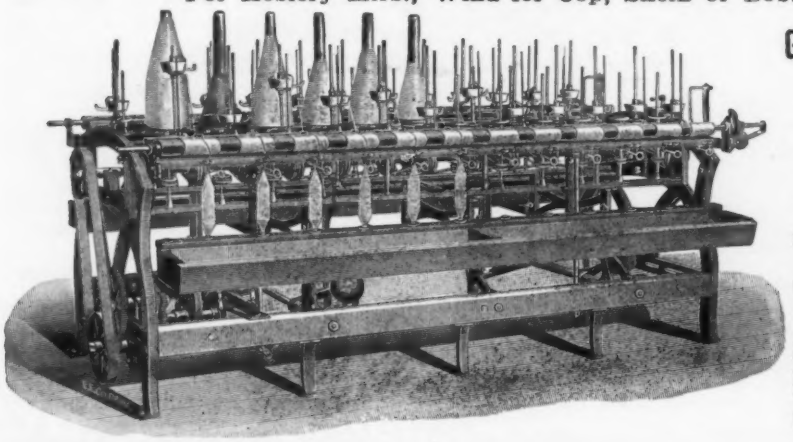
OVER 1,650 PAYNE WINDERS IN USE

For Hosiery Mfrs., Wind for Cop, Skein or Bobbin.



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Builders of the

Improved

Upright Spoolers,

To Spool from Cop, Skein or Bobbin.

Doubling Spoolers, for doubling 2, 3, or more ends into one,

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Ring Dresser, Spooler and Reel Spindles, Cop Skewers, Warp, Spool, Spooler, Guides, Bolsters and Stops Made and Repaired at Short Notice.

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We can furnish you needles for any make of machine that you use. We number among our customers, the best known mills in this country. We will be pleased to estimate on any line.

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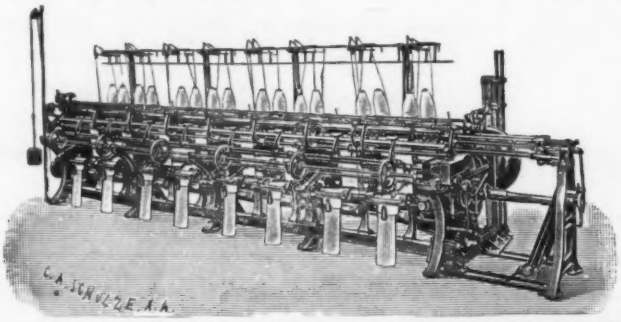

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Flat Knitting Machines

(LATCH NEEDLES)

This cut shows the **AUTOMATIC NARROWING MACHINE**, eight at once, for the manufacture of plain, seamless legs of Ladies' hose in endless bands with dividing thread. These legs, footed on the Circular machine, give the most perfect and cheapest full fashioned seamless hose that ever existed on the market.

N.B.—Narrowing Machines are built in various types for the manufacture of all kinds of underwear, garments, etc

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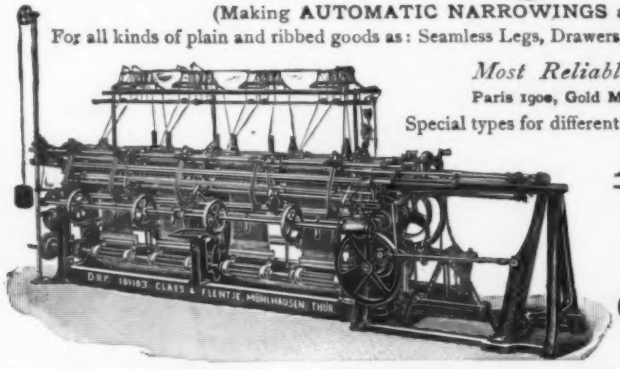
(Making AUTOMATIC NARROWINGS and WIDENINGS)

For all kinds of plain and ribbed goods as: Seamless Legs, Drawers, Combinations, Sleeves, Suits, Blouses, etc.



Most Reliable and Productive Machine!

Paris 1900, Gold Medal! Paris 1900, Gold Medal!

Special types for different articles. Number of heads to order.

Automatic Sweater Machine

With Independent Heads, Latest Improvements.
Recognized as "The Best"

Ask for samples and particulars, state gauge and size you need.

Claes & Flentje

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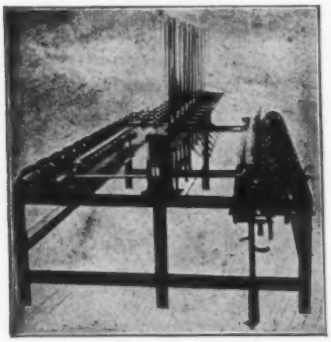

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Lindley's New Automatic Power Glove Fingering Machine, Cardigan Jacket and Circular Knitting Machines for Shirts and Hosiery.

Germantown Skein Winder and Links for Double Ribs

Cylinders and Dials of all kinds made and hardened. Special Machine and Jobbing Work promptly attended to. Also equipped to do general repairing of Platt's Cotton Spinning Machinery. Correspondence solicited.

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5000 DOZEN

STAYS OR FACINGS

PER DAY

Can be cut on THE KENNEDY UNIVERSAL BAND FOLDING and CUTTING MACHINE.

THOS. KENNEDY & SON, COHOES, N. Y.

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Machinist,

Repairs to Hosiery and Underwear Machines, Cylinders and Dials of every description.

FINE MACHINE WORK.

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We HARDEN all CYLINDERS and DIALS large and small.

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Sole Manufacturer of the

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PATENTED JANUARY 7, 1896.

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Original and Still the Best.

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CIRCULAR MACHINES,
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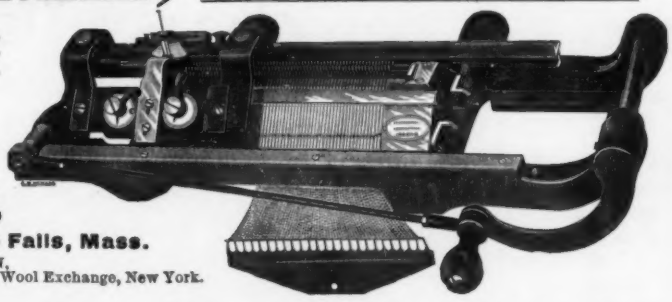

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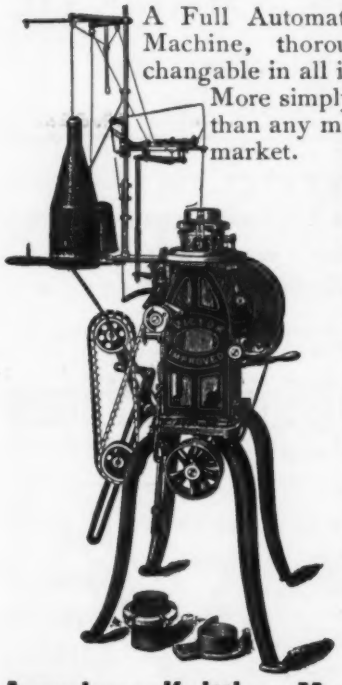
The "New" Victor Knitting Machine



A Full Automatic Seamless Machine, thoroughly interchangable in all its parts.

More simply constructed than any machine on the market.

Full Automatic Two-Color Striping Machine

Full Automatic Combination Lace and Stripe Machine

American Knitting Machine Co.,

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Standard Machine

Superior to All Others in Economy of Operation, Production and Fabric.

Best Built, Easiest Operated, Superior Fabric.

STANDARD B, Automatic Double Sole and all Improvements.

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Estimates Furnished for Complete Hosiery Plant.

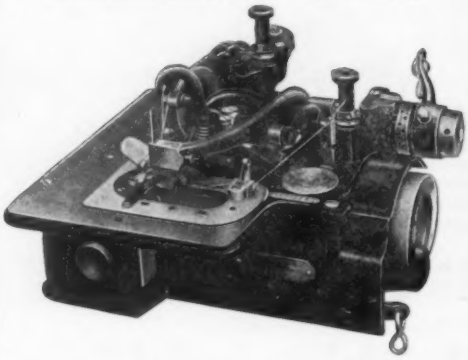
WILLCOX & GIBBS

"OVERLOCK" Machine.

(TRADE MARK.) (Pat. April 5, 1892.)

Patent twice upheld by the U. S. Court of Appeals.

For
Trimming, Seaming (or Hemming or Overedging) and Covering Raw Edges of Knit Underwear and Hosiery
in
ONE OPERATION
and for making
"Overlock" Corded Edge on Lace Curtains, Silks, Ribbons, etc.



WARNING!

Manufacturers and dealers are warned that not only is the "Overlock" Machine fully protected by patents, particularly our four patents of April 5, 1892; one of May 26, 1896 and one of August 11, 1903, but the edging products are also protected by patents of March 10, 1896, Dec. 26, 1899 and August 11, 1903.

Trade Mark Registered

3,000 Perfect Stitches Per Minute.

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LACINGS FOR OVERSHIRTS and UNDERWEAR.

Tipped and Tasseled.

Hepner & Horwitz, 30 Howard St., N. Y.

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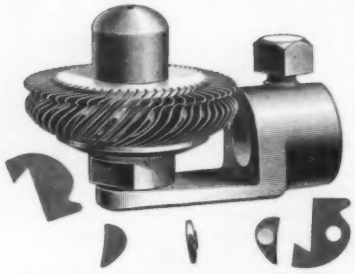

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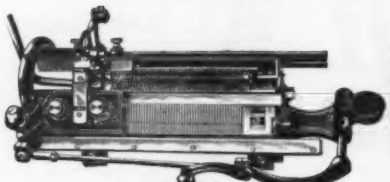
Best Knitting Machines

IMPROVED CONSTRUCTION

For Hand and Power Driving.



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Auto. Rib-top, Fancy-stitch Jacquard Machines.

Everywhere in work. 80,000 Machines sold.

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EXCELSIOR NEEDLES.
The best Hosiery Needles in the market.
Manufactured by
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W.M. BREEDON'S SON,
MANUFACTURERS OF
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All Work Guaranteed. MANCHESTER GREEN, CONN.

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ELECTRIC
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12 inches to 12 feet.
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Agents for EXCELSIOR NEEDLE CO., and NATIONAL NEEDLE CO.

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NEW AND SECOND HAND.
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CRANE MFG. CO. Lakeport, N. H.
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KNITTING MACHINE.
For Hosiery, Shirts, Drawers, Jersey Cloth and Stockinet.
A Specialty of Hardened Bladed Burr Wheels with Self-Oiling Brackets.

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For Ladies', Gents', and Children's Goods.
LATEST STYLES.
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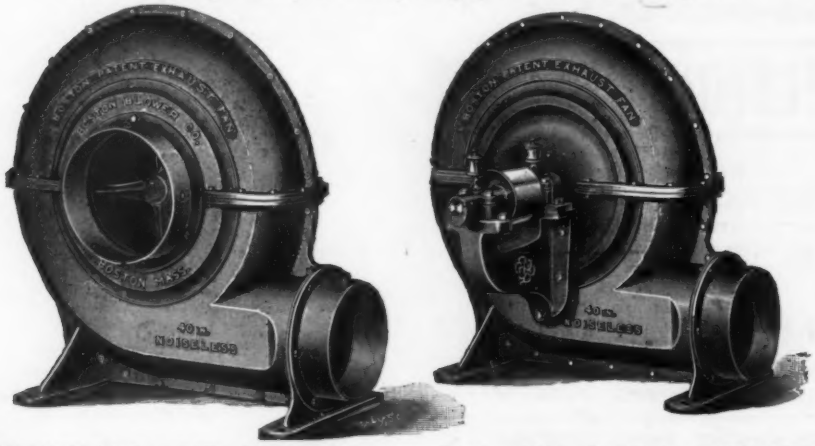
MAKER OF
Drying Form Boards
OF EVERY VARIETY.

Boston Wool Exhausters, with Removable Tops.

As used in Connection with Pneumatic Conveyor System for Handling Wool, Cotton, Rags, Excelsior, Jute, etc.



Inlet Side of Right-hand Wool Exhauster. **Pulley Side of Left-hand Wool Exhauster.**

This machine is similar in design to the regular Boston Patent Exhaust Fan, but is fitted with a special wheel for handling fibrous materials, and the top is removable.

This latter feature is especially desirable when handling wet or greasy materials or in handling anything, in fact, which would leave a deposit on the inside of fan, as the entire top may readily be removed for inspection or cleaning without disconnecting either pipe or belt connections.

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Reels for Cotton WOOLEN AND WORSTED

Patented Hosiery Winders, Cop Winders and Spoolers.

LINDSAY, HYDE & CO.,

2124 to 2130 East York St., PHILADELPHIA, PA.

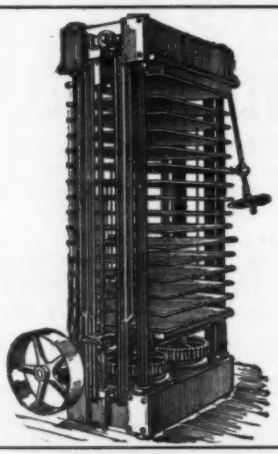
Water Wheel Governors

For TEXTILE MILLS

We Guarantee Satisfaction.

Replogle Governor Works

Write for Catalogue T. AKRON, OHIO.



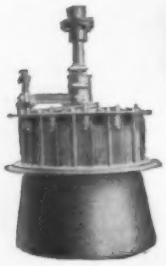
Reliance Hot Plate Press

For Hosiery and Underwear Trade.

For price and particulars address

CHARLES HART

Hedge and Brown Sts., Frankford, Phila., Pa.



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We use **Bolted Plate Couplings** on the upright shafts of our **Samsons** because they are more **Rigid** than **Jaw Clutch Couplings** and are not liable to get out of alignment. The **Buckets** are made of **Flange Steel** and the **Runners** are keyed to **Hammered Wrought Iron** or **Steel Shafts.** Write Department A-5 for Catalogue.

The James Leffel & Co., SPRINGFIELD, OHIO, U. S. A.

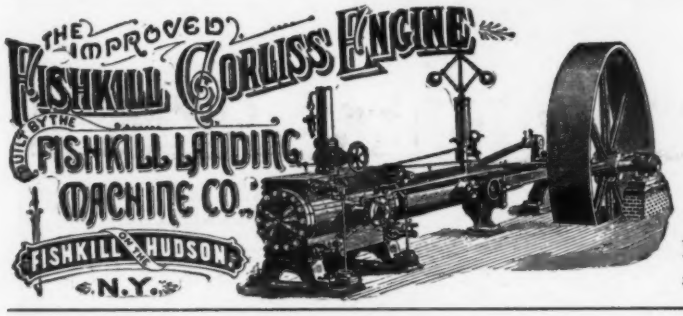
"A B C" Disc Ventilating Fans

Remove steam from slashers. Prevent condensation of steam in dye rooms. Cool and ventilate all overheated apartments. Are strong, durable, efficient.

SEND FOR CATALOGUE No. 161G.

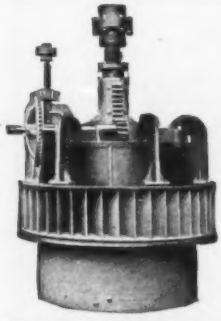
American Blower Company, Detroit, Mich.

NEW YORK CHICAGO LONDON



Most Efficient and Economical Power in the world For Textile Mills.

It has NO EQUAL for Close Regulation and Noiseless Operation. Send for Catalogue.



Risdon-Alcott Turbine Co.

MOUNT HOLLY, NEW JERSEY, U. S. A.

RISDON CELEBRATED TURBINE
ALCOTT HIGH DUTY TURBINE

On Horizontal or Vertical Shafts.

These Turbines are recognized as the most effective water wheels made. Your inquiries should come direct to us for this class of machinery.

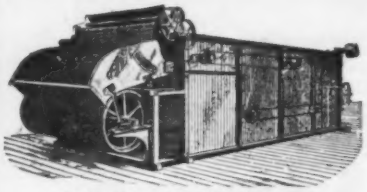
PAIR McCORMICK TURBINES

4,000 H. P., 72 ft. head, arranged to drive generator and a single turbine to drive exciter. Five settings built for the Hudson River Water Power Company's Spier Falls plant and 14 pairs 51 inch for their plant at Mechanicsville, N, Y.

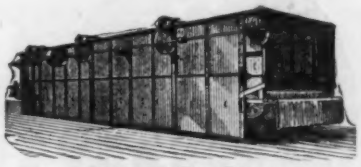
Write for Catalogue if contemplating purchase of turbines.

S. MORGAN SMITH CO.
YORK, PA.
Boston Office, 176 Federal Street.

MAY 16 1904



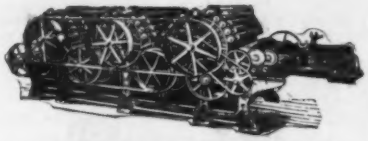
Automatic Cotton Stock Dryer.



Automatic Yarn Dryer.

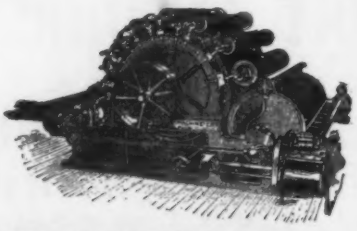
"CYCLONE" DRYERS

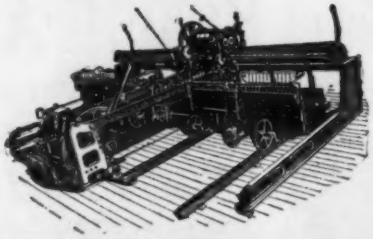
For Cotton Stock, Wool Stock, Rags,
Yarn, Cloth, Underwear, Stockings, Etc.



"PROCTOR"
Garnett Machines and Pickers

For reducing to fibre Cotton and Woolen
Waste, Cloth Clippings, Etc.





"FURBUSH" Woolen Mill Machinery

Including Pickers, Cards, Mules, Twisters,
Warpers, Dressers, Spoolers, Etc.

Manufactured by

THE PHILADELPHIA TEXTILE MACHINERY CO.,

Hancock and Somerset Sts., - PHILADELPHIA, PA.

Talks to Textile Manufacturers

CHAPTER III

Now that you've seen by others' experience that it pays to advertise textiles, there remain but two things to be done in your case:

FIRST—Planning your advertising campaign.

SECOND—Carrying it out successfully.

Ninety-nine out of one hundred of the failures in advertising failed at the end because they had failed before they began. The other one per cent. failed because they didn't know how to carry out a good plan already formed.

If planning the campaign seems veiled in mystery to you, let me clear it up for you; it is just as certain in results as the product of your looms once the pattern is started; and your looms seem a great deal more wonderfully mysterious to me than the planning of any advertising campaign I have had to do with.

Nearly a score of manufacturers have recently given their planning over to me. When you are ready, I would like to add your own business.

And after the planning I can still help you—in the carrying out of the plans.

Address all textile communications to my New York Office, please.

THOMAS BALMER, Advertising Manager

THE BUTTERICK TRIO

THE DELINEATOR——THE DESIGNER——NEW IDEA WOMAN'S MAGAZINE

Chicago Office: 200 Monroe St. **Butterick Building, New York**

JAMES SMITH WOOLEN MACHINERY CO.

411 to 421 Race Street, Philadelphia.

Woolen Machinery

FOR

Carding, Spinning, Wool Washing, Carnetting, Pickering, Drying, Burring, Cleaning, Finishing.

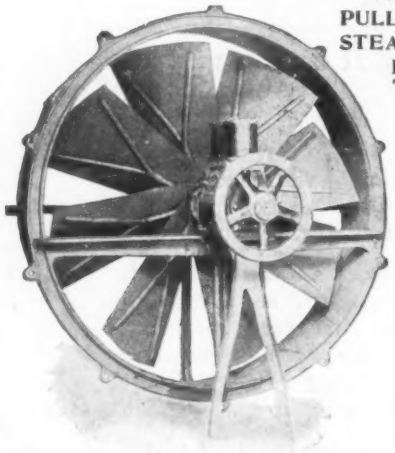
Cotton Batting and Waste Machinery.

FOR MORE COMPLETE LINE SEE PAGE 59.

BUFFALO DISK WHEELS

For Cooling, Ventilating, Drying

TYPES:
PULLEY
STEAM
ELEC-
TRIC



For Removing Steam from Slashers and Dye-Houses as well as all offensive odors common to dyeing processes. They are largely and successfully employed in cotton-linen and woolen mills for such purposes as well as for preventing harmful condensation of steam in the room.

BUFFALO FORGE COMPANY, Buffalo, N. Y.

NEW FOSTER CONE.

Open wind from start to finish of Cone.

No press-offs from knots, over-winds, etc.

The only perfect system of winding yarn for knitting purposes.

Over 30,000 spindles in use in the U. S.

FOSTER MACHINE CO.,
Westfield, Mass.

Walworth Manufacturing Co.,

HIGH PRESSURE

VALVES AND FITTINGS

"Walmanco" Pipe Flanges,
"Never Stick" Blow-off Cocks, Mill Supplies.

GENERAL OFFICES:

132 FEDERAL STREET, BOSTON, MASS.

New York Office: Park Row Building.